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ABSTRACT

This publication was written for use by the Department of Defense Dependent Schools Pacific Region science coordinators, school principals, science department chairs and teachers as they worked to identify strengths and weaknesses of science programs in middle and high schools. It can also be used by science coordinators, during school visits. This guide contains space for recording information concerning: school name and country; visitation date(s) and number; purpose(s) of the visit; teachers, specialists, and administrators visited; the science department; science budget; library and media center; computer program in science; science curriculum guides; sequential learning guides; science courses; science teaching staff; adopted textbooks; science laboratories; science teacher inservice program; student handbook and course description guides; North Central Association evaluation; school improvement plan; standardized testing program; school wide action plan; and general observations and recommendations. The appendix includes portions of each memorandum and other documents cited in context and listed in the beginning of this publication. These are: science quality program indicators; administrator's guide; science objectives; definition of laboratory science courses and science laboratory sessions; sequential learning guide; course titles and student information system computer codes; approved textbook listing; North Central Association standards for secondary schools (staffing); educator applicant evaluation guide; and high school graduation requirements. (YP)

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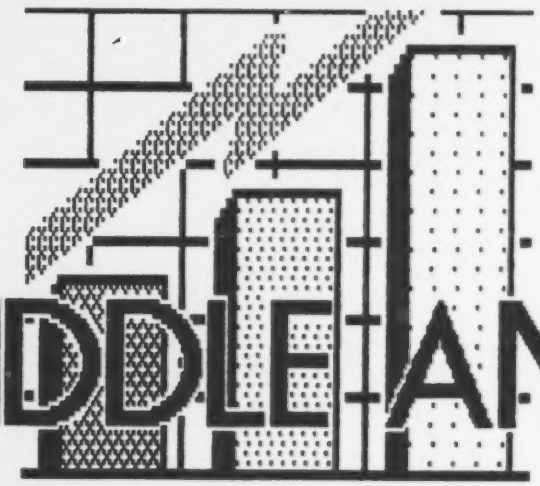

MIDDLE AND HIGH SCHOOL SCIENCE PROGRAM MANAGEMENT

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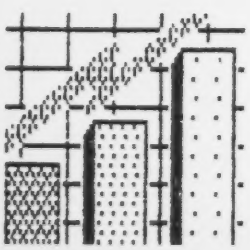

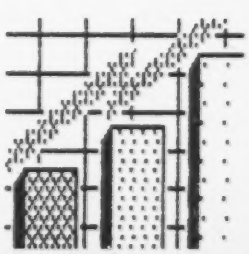

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DEPARTMENT OF DEFENSE DEPENDENT SCHOOLS PACIFIC

MIDDLE AND HIGH SCHOOL SCIENCE EDUCATION PROGRAM MANAGEMENT GUIDE

SY89-90

EDITION TWO

SEPTEMBER 1989

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CONTENTS

Title	Page
Introduction	03
List of Supporting Documents	04
School Name and Country	05
Visitation Date/s and Number	05
Purpose/s of the Visit	05
In Briefing	05
Teachers, Specialists and Administrators Visited	07
Quality Program Indicators	07
Science Department	09
Science Budget	10
Library and Media Center	12
Computer Program in Science	14
Science Objectives Guides	16
Sequential Learning Guides	18
Science Courses	19
Science Teaching Staff	21
Adopted Textbooks	23
Science Laboratories	26
Science Teacher Inservice Program	33
Student Handbook/School Course Description Guide	34
North Central Association Evaluation	35
School Improvement Plan	35
Standardized Testing Program	36

School Wide Action Plan.....38

General Recommendations.....39

Out Briefing.....40

Appendix.....41

INTRODUCTION

The publication was written for use by the Department of Defense Dependent Schools' Pacific Region science coordinator, school principals, science department chairs and teachers as they work to identify strengths and weaknesses of their science programs. The guide is also used as a notebook by the science coordinator during school visits. Wherever possible, references have been cited in context so that users may, if necessary, consult the supporting documents. A list of those references is provided below in List of Supporting Documents Section. The science section of the relevant documents are included sequentially in the Appendix.

LIST OF SUPPORTING DOCUMENTS

01. ETG/635-3001/303-5 Memorandum Quality Program Indicators, of 87MAR23.

02. DS Manual 2005.1, Administrators' Guide, section 402, of 88FEB.

03. DS Manual 2200.1, Science Objectives for 1985-1992.

04. DoDDS-P/Director Memorandum, Definition of Laboratory Science Courses and Science Laboratory Sessions, of 87OCT07.

05. 7-12 Sequential Learning Guide DSPA Manual 2000.9.

06. Department of Defense Dependent Schools Learning Course Standards.

07. ERH/635-2151/303-11 Memorandum Approved Textbook Listing, of 89AUG18.

08. NCA Standards For Secondary Schools (staffing).

09. The DoDDS Educator Applicant Evaluation Guide School Year 1989-1990.

10. DS Regulation 2000.1, Department of Defense Dependent Schools High School Graduation Requirements, of September 7, 1984.

11. NCA Standards For Secondary Schools (staffing).

SCHOOL AND COUNTRY NAMES

_____

SCIENCE COORDINATOR VISITATION DATE/S AND NUMBER

_____

PURPOSE/S OF THE SCIENCE COORDINATOR VISIT

1. _____

_____

2. _____

_____

3. _____

_____

VISIT IN BRIEFING

1. Name/s of individual/s with whom the briefing was held: _____

_____

2. Previous Visit:

   a. Date: _____

   b. Recommendations for improvement and action taken:

      (01) _____

      _____

      Action: _____

      (02) _____

Action: _____

(03) _____

Action: _____

(04) _____

Action: _____

(05) _____

Action: _____

(06) _____

Action: _____

(07) _____

Action: _____

(08) _____

Action: _____

(09) _____

Action: _____

(10) _____

Action: _____

(11)_____

_____

Action:_____

(12)_____

_____

Action:_____

QUALITY PROGRAM INDICATORS

1. Quality Program Indicators (ETG/635-3001/303-5 Memorandum of 87MAR23) identified by the school administrator as those upon which he or she would like the evaluation to focus:

a._____

_____

b._____

_____

c._____

_____

d._____

_____

TEACHERS, SPECIALISTS AND ADMINISTRATORS VISITED AND OR PART OF THE EVALUATION

1.

NAMES/RESPONSIBILITIES	NAMES/RESPONSIBILITIES
a._____	n._____
b._____	o._____
c._____	p._____

d. _____ q. _____

e. _____ r. _____

f. _____ s. _____

g. _____ t. _____

h. _____ u. _____

l. _____ v. _____

j. _____ w. _____

k. _____ x. _____

l. _____ y. _____

m. _____ z. _____

2. Notes:

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

e. _____

_____

f. _____

_____

SCIENCE DEPARTMENT

1. General Observations: Yes No

a. Program Administration.

(01) A science department chairman coordinates the science program. _____|_____

(02) A science department chair has full administrative responsibility for the science program except teacher evaluation. _____|_____

(03) Supervision of the science program is done by regular school administrators. _____|_____

(04) Supervision of the science program is judged to be adequate. _____|_____

(05) Administrative support of the science program is adequate. _____|_____

b. Curriculum Coordination:

(01) There is vertical coordination in the program from grade to grade. _____|_____

(02) There is horizontal coordination among course sections at the same grade/course level. _____|_____

(03) Repetition in course content is limited from course-to-course except where it is planned. _____|_____

(04) Teachers have an opportunity to plan with other teachers;

(a) in the same course. _____|_____

(b) teaching different courses. _____|_____

c. Decision-making Process in the Science Program:

(01) Teachers have frequent opportunities for staff input on the science program. _____|_____

(02) Teachers have great independence in developing their science courses. _____|_____

(03) Teachers have few opportunities to influence the science program. _____|_____

2. Name of Department Chair: _____

3. Size of Department: _____

4. Frequency of Meetings: _____

5. Minutes of Meetings: _____

6. Observations/Recommendations:

a. _____

_____

_____

b. _____

_____

_____

SCIENCE BUDGET

(DS Manual 2005.1, Administrators' Guide, section 402):

1. Dollar Amount: _____

a. Consumable Materials: _____

b. Equipment: _____

(01) Replacement: _____

(02) New: _____

(03) Repair: _____

c. Library Materials: _____

d. Science Kits (Grades 7, 8 and 9) _____

e. Textbooks: _____

2. Name of Person Who Drafts the Budget: _____

3. Process Used When Drafting the Budget:_____

_____

_____

_____

_____

_____

4. Yearly Budget Deadline as Set by the Administration:_____

5. Observations/Recommendations:

a._____

_____

_____

Recommendation:_____

_____

b._____

_____

_____

Recommendation:_____

_____

c._____

_____

_____

Recommendation:_____

_____

d._____

_____

_____

Recommendation: _____

_____

LIBRARY AND MEDIA CENTER

1. General Adequacy: The presence of sufficient and appropriate science books, student periodicals, professional science teaching periodicals and science media programs to carry out the conditions of the curriculum are essential to a good science education program. All of these items should be matched as closely as possible with the science program objectives and teaching methods required by the curriculum. Versatility, intended use, the user, and application to student investigations must be considered in assessing the appropriateness of existing library and media center inventories to adequately support the science education program as well as new purchases in the area of science.

To assess the general adequacy of the science library and media center portion of the science program, all components that have been met in the list below should be checked.

FUNDAMENTAL	SUBSTANTIAL	EXEMPLARY
(_) Sufficient library books and media programs are available to support all activities and topics in the courses offered.	(_) All necessary instructional resources including audio visual resources related to the science curriculum are available in the media center.	(_) Full use is made of instructional media to supplement science learning in the classroom.
(_) An annual budget provides for the purchase of science books and media programs.	(_) Equipment and library materials provided for in the curriculum plan are available to individuals or small groups for use when conducting investigations.	(_) Lists of science media programs held by the media center are available for teacher use.
		(_) There is an on going program conducted by media specialist and science department to evaluate the currency of science books and media programs.

2. Books:

a. Approximate number of science books held: _____

b. Are the science books well distributed across all science areas?_____

_____

3. Science reference documents:_____

a. Professional periodicals in science areas:

(01) Number:_____

(02) Names:

(a)_____

(b)_____

(c)_____

(d)_____

(e)_____

(f)_____

b. Student periodicals in science areas:

(01) Number:_____

(02) Names:

(a)_____

(b)_____

(c)_____

(d)_____

(e)_____

(f)_____

4. Audio/Visual/Media Materials:

a. Number of Programs:_____

b. Distribution Across the Science Areas:_____

_____

5. Observations/Recommendations:

a.___ _____

_____

_____

Recommendation:_____

_____

b._____

_____

_____

Recommendation:_____

_____

c._____

_____

_____

Recommendation:_____

_____

d._____

_____

_____

Recommendation:_____

_____

COMPUTER PROGRAM IN SCIENCE

1. Software:

   a. Number of science programs held by the school:_____

   b. Is the software compatible with the computers?_____

   _____

c. Is the software well distributed across the science areas?_____

2. Hardware:

a. How many computers are used in the program?_____

3. Uses:

a. Subjects in which the computers are used:_____

_____

b. Ways in which the computer/s is/are used:

(01)_____

(02)_____

(03)_____

(04)_____

4. Observations/Recommendations:

a._____

_____

_____

Recommendation:_____

_____

b._____

_____

_____

Recommendation:_____

_____

c._____

_____

_____

Recommendation:_____

d. _____

Recommendation: _____

SCIENCE OBJECTIVES GUIDE

(DS Manual 2200.1, Science Objectives for 1985-1992)

1. Is a copy of the current guide available in the school office files? _____
2. Does each science teacher science have a copy of the most recent guide?

3. Is the guide used? _____
   a. How? _____
   b. When? _____
4. Observations/Recommendations:
   a. _____

   Recommendation: _____

   b. _____

Recommendation: _____

_____

c. _____

_____

_____

Recommendation: _____

_____

d. _____

_____

_____

Recommendation: _____

_____

SEQUENTIAL LEARNING GUIDE

(7-12 Sequential Learning Guide DSPA Manual 2000.9)

1. Is a copy of the guide available for use in the school office files?_____

2. Are science sections of the guide wall chart posted where they can be used by:

   a. Administrators_____

   b. Teachers_____

   c. Students_____

   d. Parents_____

3. Does each science teacher have a copy of the guide?_____

4. Is there a relationship between information in the science section of the guide and content in the various science courses being offered?

5. Observations/Recommendations:

   a._____

   Recommendation:_____

   b._____

Recommendation:_____

_____

c._____

_____

_____

Recommendation:_____

_____

d._____

_____

_____

Recommendation:_____

_____

SCIENCE COURSES

1. Which of the following courses are offered (Learning and Course Description Standards Guide)?

a. Life science:_____

b. Earth science:_____

c. Physical science:_____

d. Biology I:_____

e. Chemistry I:_____

f. Physics I:_____

g. Biology II:_____

h. Chemistry II:_____

i. Physiology:_____

j. Physics II:_____

k. Science-Technology-Society:_____

l. AP Biology:_____

m. AP Chemistry:_____

n. AP Physics B:_____

o. AP Physics C:_____

p. Science Research:_____

q. Astronomy:_____

r. Marine Biology:_____

s. Oceanography:_____

2. Have student centered enabling (sub-instructional) objectives been established for each science course?

_____

3. Observations/Recommendations:

a._____

_____

_____

Recommendation:_____

_____

b._____

_____

_____

Recommendation:_____

_____

c._____

_____

Recommendation: _____

_____

d. _____

_____

_____

Recommendation: _____

_____

SCIENCE TEACHING STAFF

1. General Adequacy. Competency to teach science requires a unique preparation and experience. To reach the optimum performance level, secondary teachers must go well beyond the minimum course work required for certification. They must become involved in professional organizations, read professional journals related to their field and stay abreast of contemporary curriculum recommendations. In addition, qualified science teachers must be able to work cooperatively within a hierarchy of responsibilities to provide a coordinated science program.

To assess the general adequacy of the science teaching faculty, all components that have been met in the list below should be checked.

FUNDAMENTAL	SUBSTANTIAL	EXEMPLARY
(_) All science teachers are certified to teach in the science areas to which they are assigned.	(_) All science Teachers have a major in the area they are teaching and and have credits in at least one other science to provide a broad background for understanding.	(_) A majority of the science teachers have at least a Master's degree or its equivalent related to the area or areas they are teaching.
(_) All science teachers are familiar with existing major curriculum developments in their teaching areas.	(_) A majority of the science teachers have attended at least one professional meeting in the past year.	(_) All science teachers are active members of at least one professional organization and a majority have participated in the program of one professional meeting.
(_) A majority of the science teachers regularly read one		

professional journal.

(_) All science teachers know appropriate safety practices for conducting laboratory activities at their grade level.

(_) All science teachers can show evidence of having specifically studied major curriculum developments in their teaching area.

(_) Individual teachers have been designated as having specific leadership responsibilities in conducting the science program.

(_) All science teachers have directly participated in curriculum development, revision or adaptation projects that have been implemented in classroom teaching.

(_) A qualified individual is designated as coordinator of the science program with other staff members assigned to a hierarchy of teaching-leading responsibilities.

---

2. Are teachers prepared academically to teach the courses assigned to them (NCA Standards For Secondary Schools; The DoDDS Educator Applicant Evaluation Guide) and if not where are the problems?

_____

_____

3. Observations/Recommendations:

a._____

_____

_____

Recommendation:_____

_____

b._____

_____

_____

Recommendation:_____

_____

c._____

Recommendation:

d.

Recommendation:

ADOPTED TEXTBOOKS

(Approved Textbook Listing ERH/635-2251/303-11 Memorandum of 89AUG18)

1. Is the approved list of science textbooks available?

2. Are the approved textbooks and laboratory manuals being used?

a. Focus on Life Science, 1984:

b. Focus on Life Science: A Learning Strategy for the Laboratory:

c. Focus on Earth Science, 1984:

d. Focus on Earth Science: A Learning Strategy for the Laboratory:

e. Focus on Physical Science, 1984:

f. Focus on Physical Science: A Learning Strategy for the Laboratory:

g. Biology: Living Systems, 1983:_____

h. Biology: An Everyday Experience, 1981:_____

i. Probing Levels of Life: A Laboratory Manual:_____

j. Laboratory Biology: Investigating Living Systems:_____

k. Biology: Laboratory Experience:_____

l. Chemistry: A Modern Course, 1983:_____

m. Laboratory Chemistry:_____

n. Solving Problems in Chemistry:_____

o. Modern Physics, 1984:_____

p. Modern Physics: Exercises and Experiences in Physics:_____

3. Does each science teacher have:

a. A teachers' edition of the approved text?_____

b. A teachers' edition of the lab manual?_____

c. A set of other publisher generated course support materials?_____

_____

4. Text books and manuals uses for courses not when these items are not part of the normal 7-yeay DoDDS textbook buy?

a. Biology II:_____

b. Chemistry II:_____

c. Physiology:_____

d. Physics II:_____

e. Science-Technology-Society:_____

f. AP Biology:_____

g. AP Chemistry:_____

h. AP Physics B:_____

i. AP Physics C:_____

j. Science Research: _____

k. Astronomy: _____

l. Marine Biology: _____

m. Oceanography: _____

5. Observations/Recommendations:

a. _____

_____

_____

Recommendation: _____

_____

b. _____

_____

_____

Recommendation: _____

_____

c. _____

_____

_____

Recommendation: _____

_____

d. _____

_____

_____

Recommendation: _____

_____

SCIENCE LABORATORIES

(DS Regulation 2000.1, Department of Defense Dependent Schools High School Graduation Requirements of September 4, 1984)

1. Inclusion:

a. Are labs part of every science course (DoDDS-P/Director Memorandum, Definition of Laboratory Science Courses and Science Laboratory Sessions, dated 07 Oct 1987)?

_____

b. How frequently are labs conducted?_____

_____

_____

2. Equipment, Strengths and Shortfalls (For titles see 7-12 Learning and Course Description standards Guide).

a. General Adequacy: The presence of sufficient and appropriate equipment to carry out the conditions of the curriculum is essential to a good science education program. All equipment must be matched as closely as possible with the science program objectives and teaching methods required by the curriculum. Versatility, intended use, the user, and application to student investigations must be considered in assessing the appropriateness of existing equipment inventories as well as new equipment purchases.

To assess the general adequacy of the science laboratory portion of the science program, all components that have been met in the list below should be checked.

FUNDAMENTAL	SUBSTANTIAL	EXEMPLARY
(_) Sufficient laboratory and demonstration equipment is available to conduct all activities provided for in the textbook or course of study.	(_) Equipment required by the curriculum plan is available to individuals or small groups to conduct the laboratory phase of the program.	(_) Versatile equipment is available to provide for open ended student investigations.
(_) An annual budget provides for equipment purchases and maintenance.	(_) All recommended safety equipment is available.	(_) Sophisticated equipment is provided for collecting and analyzing quantitative data.
		(_) Specialized equipment is available to teachers and students for functions such as plant

and animal care, culture incubation, radiation studies, analytical investigations and astronomical observations.

b. Courses:

(01) Life science:

(02) Earth science:

(03) Physical science:

(04) Biology I:

(05) Chemistry I:

(06) Physics I:

(07) Biology II:

(08) Chemistry II:

(09)Physiology:

(10) Physics II:

(11) Science-Technology-Society:

(12) AP Biology:_____

(13) AP Chemistry:_____

(14) AP Physics B:_____

(15) AP Physics C:_____

(16) Science Research:_____

(17) Astronomy:_____

(18) Marine Biology:_____

(19) Oceanography:_____

3. Supplies:

a. General Adequacy: The presence of sufficient and appropriate supplies to carry out the conditions of the curriculum is essential to a good science education program. All supplies must be matched as closely as possible with the science program objectives and teaching methods required by the curriculum. Versatility, intended use, the user, and application to student investigations must be considered in assessing the appropriateness of existing supply inventories as well as new supply purchases.

To assess the general adequacy of the science laboratory portion of the science program, all components that have been met in the list below should be checked.

FUNDAMENTAL	SUBSTANTIAL	EXEMPLARY
(_) Sufficient laboratory and demonstration materials are available to conduct all activities provided for in the textbook or course of study.	(_) Supplies required by the curriculum plan are available to individuals or small groups to conduct the laboratory phase of program.	(_) Versatile supplies are available to provide for open ended student investigations.
(_) An annual budget provides for supply purchases.	(_) Live and perishable supplies are stored and provided as needed for individual laboratory work.	
(_) All student materials necessary to conduct the adopted program are available.		
(_) All consumable materials and supplies are replaced promptly.		

a. Are the quantities sufficient?_____

b. Is their arrival timely?_____

4. Safety:

a. Number of science laboratories:_____

(01) Recommended student capacity:_____

(02) Actual student capacity:_____

b. Number of exits per laboratory:_____

(01) Exits properly marked: Yes_____No_____

(02) Storage rooms properly marked: Yes_____No_____

c. Number and type of fire extinguishers:

	Type	Location
(01) Carbon dioxide:	_____	_____
(02) Soda acid:	_____	_____

(03) BC: _____ _____

(04) ABC: _____ _____

(05) Water: _____ _____

d. Number of sand buckets with sand: _____

e. Number of approved fire blankets: _____

f. Number of first aid or emergency charts: _____

g. Number of first aid kits: _____

h. Number of safety showers that work: _____

i. Number of eyewash stations: _____

(01) Installed with plumbing and aerifier: _____

(02) Squeeze-bottle type: _____

(03) Other: _____

j. Eye, face and body protection:

(01) Number of safety glasses with full side shields: _____

(02) Number of safety chemical goggles: _____

k. Number of rubber gloves: _____

l. Number of rubber, plastic, cloth aprons: _____

m. Provision made for grounding of all electrical equipment: _____

_____

n. All waste receptacles properly marked: Yes _____ No _____

o. Chemical storage cabinets:

(01) Flammable: _____

(02) Acids and bases: _____

p. Ventilation: _____

(01) Fume hood/s: _____

(02) Storeroom: _____

(03) Lab space:_____

q. Master cutoffs:

(01) Water: Yes_____No_____

(02) Gas: Yes_____No_____

(03) Electricity: Yes_____No_____

r. Safety discussions held regularly: Yes_____No_____

5. Facilities (including classrooms where lab activities are conducted):

a. General Adequacy: Facilities along with equipment and materials determine the nature of the learning environment. Ideally, facilities will never limit learning activities. Facilities should be both versatile and varied to allow for independent study and investigations as well as group activities. Space should not be unnecessarily limited.

To assess the general adequacy of the science facilities portion of the science program, all components that have been met in the list below should be checked.

FUNDAMENTAL	SUBSTANTIAL	EXEMPLARY
(_) Science classrooms are provided with special facilities for teacher demonstrations.	(_) Laboratory stations are provided for at least every two students assigned to a classroom at a given time.	(_) A science materials center and open lab staffed by certified science teachers is available to students at all times.
(_) Flat table space is available in all science classrooms for individual or small group science activities.	(_) Water, gas, electricity and storage space for basic equipment are provided at or near each laboratory station.	(_) Well equipped labs are available to all students during all scheduled science classes.
(_) Sources of water are provided in every science classroom.	(_) Space is provided adjacent to science classrooms for equipment storage and extracurricular or unscheduled student activities in science.	(_) Facilities are designed so that equipment and materials are available in the labs where students can supply their own needs as they carry out their investigations.
(_) Storage facilities for science equipment and materials are available in science classrooms or in the near vicinity of the classrooms.		(_) Additional lab space is provided to allow

students to maintain equipment setups related to their investigations over a period of several days.

b. Is/are it/they adequate?_____

c. Is/are it/they configured for use with the courses it/they service/s?

d. Is/are it/they being used for its/their intended purpose/s?_____

6. Observations/Recommendations:

a._____

Recommendation:_____

b._____

Recommendation:_____

c._____

Recommendation:_____

d. _____

Recommendation: _____

SCIENCE TEACHER INSERVICE PROGRAM

1. Is there an on-going inservice program for science teachers (NCA Standards For Secondary Schools)?

2. Observations/Recommendations:

a. _____

Recommendation: _____

b. _____

Recommendation: _____

c. _____

Recommendation: _____

STUDENT HANDBOOKS / School Course Description Guide

1. Are courses offered by the school listed here?

2. Observations/Recommendations:

a. _____

_____

_____

Recomendation: _____

_____

b. _____

_____

_____

Recommendation: _____

_____

c. _____

_____

_____

Recommendation: _____

_____

d. _____

_____

_____

Recommendation: _____

_____

NORTH CENTRAL ASSOCIATION (NCA) EVALUATION

1. Date of last NCA Report: _____

2. Science related problems identified on the last NCA report:

   a. _____

   _____

   b. _____

   _____

   c. _____

   _____

   d. _____

   _____

SCHOOL IMPROVEMENT PLAN

1. Are the science education problems identified on the NCA report addressed here?

   _____

   a. Actions being taken to resolve these problems:

      (01) _____

      _____

      (02) _____

      _____

      (03) _____

      _____

      (04) _____

      _____

2. Observations/Recommendations:

a. _____

_____

_____

Recommendation: _____

_____

b. _____

_____

_____

Recommendation: _____

_____

c. _____

_____

_____

Recommendation: _____

_____

d. _____

_____

_____

Recommendation: _____

_____

STANDARDIZED TESTING PROGRAM

1. What science deficiencies were identified using standardized testing procedures (scores lower than national norms)?

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

2. Observations/Recommendations:

a. _____

_____

_____

Recommendation: _____

_____

b. _____

_____

_____

Recommendation: _____

_____

c. _____

_____

_____

Recommendation: _____

_____

d. _____

_____

_____

Recommendation: _____

SCHOOL WIDE ACTION PLAN (SWAP)

1. What procedures does SWAP use to correct the science deficiencies identified by the Standardized Testing Program?

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

2. Are the procedures identified in part "1" of this item being implemented?

_____

_____

_____

3. Observations/Recommendations:

a. _____

_____

_____

Recommendation: _____

_____

b. _____

_____

_____

Recommendation: _____

_____

c. _____

_____

_____

Recommendation: _____

_____

d. _____

_____

_____

Recommendation: _____

_____

GENERAL OBSERVATIONS/RECOMMENDATIONS

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

4. _____

_____

_____

OUT BRIEFING

1. Name of the person/s with whom the out briefing was held?_____

_____

2. Notes:

a._____

_____

b._____

_____

c._____

_____

d._____

_____

APPENDIX

This section contains those portions of each memorandum and other document cited in context and listed in the beginning of this publication. They are included here in the same order in which they are listed in the front of the document (see List of Supporting Documents).

DEPARTMENT OF DEFENSE
DEPENDENTS SCHOOLS
FUTENMA BOX 796
FPO SEATTLE 98772-0005

March 23, 1987

PACIFIC
ETG/635-3001/303-5

MEMORANDUM FOR District Superintendents
Principals

SUBJECT: Quality Program Indicators

Attached are the Quality Program Indicators each member of the Education Division has developed to use in program evaluation at the school level.

These indicators are guidelines which identify program qualities that coordinators will be observing when they visit the schools. I suggest that line administrators identify specific program indicators they want a coordinator to examine during an on-site visit, thereby the superintendent or principal will be the instructional leader who determines the direction of program evaluation.

RICHARD T. CAWLEY
Deputy Director

Attachments

DEPARTMENT OF DEFENSE
DEPENDENTS SCHOOLS
FUTENMA BOX 796
FPO SEATTLE 98772-0005

October 7, 1987

Dir
DDir
ES
Ed
RS 00064

PACIFIC

ERS/635-3982/303-15

MEMORANDUM FOR District Superintendents
Principals

SUBJECT: Science Quality Program Indicators

1. Dr. Cawley's memorandum, 23 Mar 87, subject: Quality Program Indicators, did not include the indicators for science.

2. The enclosures to this memorandum provide you with the Science Quality Program Indicators. They should be addended to your copy of Dr. Cawley's memorandum.

SIGNED

RICHARD M. SCHLENKER
Science Coordinator

Enclosures
1. Quality Program Indicators Science: Elementary
2. Quality Program Indicators Science: Secondary

cf: District Superintendent

QUALITY PROGRAM INDICATORS SCIENCE: SECONDARY (7-12)

1. The goals and objectives set forth in DS Manual 2200.1 are an integrated part of this program.

2. Courses listed in SIMS or approved in writing are taught in the curriculum.

3. Students are evaluated to determine their level of expertise with the objectives set forth in DSM 2200.1 and course grading is based upon these objectives.

4. All science courses include periodic laboratory sessions.

5. Laboratory sessions and homework assignments are chosen to foster competence with the objectives set forth in DSM 2200.1.

6. Instructional techniques include: (a) individulization; (b) multimedia approach; (c) group instruction.

7. Student centered course objectives are given to each student at the beginning of each new course.

8. Class objectives are available prior to and used during each class and they are written in student centered terms.

9. Class sessions are related to class objectives.

10. Students are afforded opportunities for independent study through participation in: (a) science fairs; (b) the JSHS.

DS Manual 2005.1
February 1988

DEPARTMENT OF DEFENSE DEPENDENTS SCHOOLS

ADMINISTRATORS' GUIDE

402 PLANNING, PROGRAMMING, BUDGETING, AND EXECUTION SYSTEM (PPBES)

A. PLANNING

The planning phase initiates the DoDDS PPBES. DoDDS managers outline goals and objectives which determine the direction and the destiny of their organization annually. These goals and objectives should be for long-term planning as well as short-term and should take into consideration fiscal constraints. For instance, planning should not be limited to those 5 years within the Five Year Defense Plan (FYDP), FY 1990-94. A good example of planning within the educational program is the Seven Year Educational Program Development Plan.

B. PROGRAMMING

During December/January the ODS Fiscal Division will issue a call to the regional directors for program objective memorandum (POM) issues. POM issues are for those programs that are new or for the enhancements of existing programs for which funding does not currently exist within the current FYDP. Issues submitted may cover all DoDDS appropriations: Operation and Maintenance (O&M); Procurement; and Military Construction (MILCON). Regional and ODS division POM issues are consolidated by the ODS Fiscal Division Budget Branch and discussed with the appropriate regional point of contact, the ODS division chiefs, and the Director, DoDDS. A final list of issues are consolidated and submitted to DASD (FSE&S) as a list of unfinanced requirements with the DoDDS POM in April. (Note: POM 90-94 will be submitted in April 1988.) The ODS Fiscal Division prepares each of the issues in the prescribed format outlined in guidance issued by OSD and defends them before the ASD (FM&P). Approved issues become part of issue books that are reviewed by the Defense Resources Board (DRB). The final decision of the DRB is issued as the Program Decision Memorandum (PDM) in late August. Those dollars included in the POM plus any issues approved by the DRB in the PDM become the base line for the Operation and Maintenance Budget Estimate Submission (BES), the Procurement Budget, and the MILCON Budget Submission to ODS/OMB on September 1.

C. BUDGETING

The ODS Fiscal Division will issue guidelines in January or February of each year for procurement budget items and will issue guidelines to govern the development of the regional operation and maintenance budget in March of each year.

For example: In March 1988, the ODS Fiscal Division will request the initial requirements for FY 1990. In accordance with those guidelines, the regional director and his/her staff will assume responsibility for the preparation of the regional budget for ODS review.

1. Process

Based upon school complex and regional office requirements, each regional director will submit their O&M and procurement budgets to ODS in accordance with the guidance issued by the ODS Fiscal Division. The O&M budget applies to 4 fiscal years: the prior year (PY=FY 1988), current year (CY=FY 1989), budget year (BY=FY 1990) and budget year plus one (BY+1=FY 1991). Emphasis in the preparation of the O&M budget should be given to the budget year and budget year plus one. The prior fiscal year serves as a base for comparison and analysis and as a means to update the current year requirements for budget execution purposes. The DoDDS budget reflects resource requirements and is included as a subelement of the DoD budget and as a separate section of the President's Budget which is presented to Congress each January.

The term "fiscal year" refers to the Federal Government accounting period which starts on October 1 each year and ends on September 30 of the following year. Operation and maintenance funds are available for 1 year only and, therefore, cannot be carried from 1 fiscal year to another. Military construction funds are available for 5 years and procurement funds for 3 years. However, in the case of procurement funds, funds are generally requested in the year in which they are obligated or at least 68 percent are obligated in the first year.

2. Regional Budget Submissions

a. Procurement. Based upon guidance issued by the ODS Fiscal Division in January, all regional directors will submit a procurement budget to the ODS Fiscal Division in March or April each year. Items included must cost $25,000 or more. Submissions must follow those procedures outlined in DS Regulation 4140.2.

b. Operation and Maintenance (O&M). Based upon guidance issued by the ODS Fiscal Division in March of each year, the regional directors will submit their budget requirements as much as 2 years in advance of execution. For example: The initial FY 1990 budget requirements will be submitted to the ODS Fiscal Division in June 1988; FY 1990 will be executed beginning October 1, 1989.

The regional budget submissions include budget exhibits which support requirements in the areas of personnel compensation and benefits, repair and maintenance projects, contractual services, etc. The key budget exhibits are OP-15 and OP-8. The basic formats for these two exhibits are prescribed in the DoD Budget Manual, DoD 7110-1-M. The OP-15 (Budget Summary) presents the DoDDS budget requirements in four broad categories: Administrative Costs; Education Costs; Logistics Costs; and Unique Costs. The OP-8 (Civilian Personnel Costs) presents the costs of

personnel compensation and benefits according to the various categories of personnel (U.S. Direct Hire--SES/GM/GS, Wage Board, P.L. Teachers; Direct Hire Foreign Nationals; and Indirect Hire Foreign Nationals).

3. Review

Upon receipt of the budget estimates from the regional offices, the ODS Fiscal Division reviews and discusses each document with the other applicable ODS divisions and the Director, DoDDS. Regional budget submissions are also discussed during the Regional Directors' Meeting which is held in July. The ODS Fiscal Division consolidates all of the DoDDS budgetary requirements and submits a Budget Estimate Submission (BES) to OSD in September. (Example: FY 1990 will be submitted to OSD in September 1988.) The BES is submitted in accordance with the guidance issued by ODS (Comptroller) with the fiscal guidance in the FYDP at POM plus any DRB decisions issued in the PDM which is signed by the Secretary of Defense in late August. The Director, DoDDS in conjunction with the Chief, Fiscal Division, ODS and the ODS Budget Officer justify the DoDDS requirements at a joint ODS/OMB hearing. Following the hearing, ODS/OMB issue Program Budget Decisions (PBD) which affect the DoDDS program. The ODS Fiscal Division with the concurrence of the Director, DoDDS either accepts or appeals the decisions. The PBD cycle occurs during the months of October through December. The BES plus any adjustments made during the ODS/OMB review cycle becomes the base line for the DoDDS President's Budget which is submitted to Congress in January. The DoDDS Budget is reviewed by four Congressional committees. They are:

a. Authorization Committees:

(1) House Armed Services Committee

(2) Senate Armed Services Committee

b. Appropriations Committees:

(1) House Appropriations Committee

(2) Senate Appropriations Committee

During Congressional reviews, DoDDS receives general and/or specific questions pertaining to the overall DoDDS program. In addition, the DoDDS Director may be asked to testify at a formal Congressional hearing. The mark-up made by each Congressional committee appears in the Congressional Record and is included as a part of the Defense Agencies section. Congressional committees may make specific reductions against the DoDDS program. Unless specifically noted otherwise, the DoDDS program also may receive pro-rata share general reductions of other Defense Agency items reduced. An appropriation is passed by Congress when an

agreement has been reached between the Congressional Committees and it has been signed by the President of the United States. If an appropriation has not been passed by October 1, Congress passes a continuing resolution (CR) pending an appropriation. The President also signs the CR. Under the continuing resolution, an agency may operate at prior year levels. No new starts or new programs are permitted under a continuing resolution.

D. EXECUTION

1. General

The overall responsibility for the execution of the DoDDS budget lies with the Chief, Fiscal Division, ODS. Each regional director has the responsibility for executing the budget of his/her region.

The regional budget submission (current year column) serves only as a plan and does not mean that funds are automatically available. The actual amount of funds which may be expended during the fiscal year for the operation of the region are set forth in the Fund Authorization Document (FAD). The FAD is the maximum amount of funds which may be expended for that fiscal year and is subject to the R.S. 1517 violations. The regional director may suballot funds to the Defense General Supply Center (DGSC) at Richmond, Virginia, and may issue funding targets to the District Superintendents Office (DSO) and/or school level.

2. Tuition Collections

It is the policy of DoD to allow the enrollment of non-DoD sponsored minor dependents in DoD dependents' schools provided that space is available and that the applicable tuition is paid in advance. DoD Directive 1342.13 establishes eligibility requirements and priorities for the applicable federally or nonfederally connected enrollments. Tuition rates are established for both federally and nonfederally connected students. The tuition rate charged includes direct cost and indirect DoD overhead costs for personnel service, unfunded benefits, and DoD user charges. The direct cost portion of the tuition is deposited to a prescribed DoDDS appropriation account (regional level) while the indirect portion of the tuition is deposited to the Miscellaneous Receipts Account of the U.S. Treasury. Detailed procedures for tuition collections, deposits, and reporting are outlined in DS Administrative Instruction 7200.2. The direct cost portion which is deposited to the regional level appropriation increases the amount of funds available for that region. Detailed instructions establishing the policies governing the computation and publication of tuition rates are outlined in DS Administrative Instruction 7209.1.

3. Reprogramming of Funds

Budget reviews should be held periodically in each region as well as in the ODS Fiscal Division during the year of execution to ensure an efficient utilization of funds. Generally, these reviews should be held at the end of 2nd Quarter, at the end of 3rd Quarter, and monthly or more often during the 4th Quarter. However, fund status should be monitored on a monthly basis throughout the fiscal year. Regional directors have the authority to internally reprogram between elements of expense and/or OP-15 line items within their allotted funds. This allows the regional director the flexibility which is necessary to accomplish planned programs and to fund unforeseen requirements. Any funds that cannot be utilized in one region should be available for withdrawal by ODS for allotment to other regions that have high priority requirements.

References:

DoD Directive 1342.13, "Eligibility Requirements for Education of Minor Dependents in Overseas Areas," July 8, 1982.
DS Administrative Instruction 7200.1, "Non-DoD Tuition Program," September 6, 1985.
DS Administrative Instruction 7200.2, "Advance Collection of Tuition Fees and Schedule 9 Reporting," September 9, 1984.
DoD Accounting Manual 7220.9-M, 1983, Part II, Chapter 26, Section D, Reimbursement Rates for Personnel Services.
DoD Instruction 7230.7, "User Charges," January 29, 1985.

DS Manual 2200.1
OCTOBER 1984

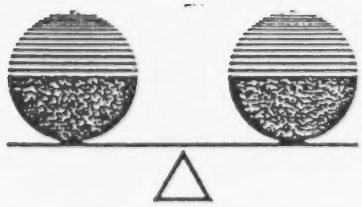
SCIENCE OBJECTIVES

FOR 1985-1992

DEPARTMENT OF DEFENSE

DEPENDENTS SCHOOLS

SCIENCE OBJECTIVES FOR 1985—1992



Foreword

This manual contains objectives intended to guide the planning, development, implementation, and evaluation of science education in the Department of Defense Dependents Schools (DoDDS). They have been developed with the assistance of DoDDS teachers and administrators who believe that all learners must acquire a realistic and functional understanding of science in order to fully participate in our technologically-oriented society. Teachers are encouraged to use the objectives as guidance for both classroom and school-level planning. The DoDDS science curriculum will be greatly strengthened through the consistent application of these objectives in the conduct of science education throughout the school system. A sincere thanks to all of those who have contributed to the development of this manual.

Steve Motta
Deputy Director

Acknowledgements

The Science Objectives Manual is a completely revised version of DS 2200.1, "Science Goals and Objectives," September, 1978, It is intended to reflect a contemporary approach to science education that emphasizes the learner's need to know and understand the important issues that relate science to society and technology. We appreciate the efforts of the many DoDDS educators who helped develop this current approach to the science curriculum and we, again, thank those who, early on, laid the foundation for this latest edition. We hope that all of these efforts will be translated into science experiences which help our students better understand the nature of science in their lives.

A Science Education Rationale

Science and technology are increasingly influential in our lives. A glance around your classroom or the laboratory should be all that is needed to convince you that these forces have forever changed many aspects of our profession. No one could deny that the discoveries of science have had a sharp impact on the way we think about the world. Somehow it has become a smaller place than we had imagined. The methods of science and technology are now shaping our national problem solving and decision making behavior. Scientists together with highly skilled technicians are now in frequent conversation with elected officials because the issues dealt with are too complex to be resolved by political means alone. The products of science and technology serve our needs but, at the same time, tend to disconcert us. Genetic engineering can deliver a plentiful and inexpensive source of insulin but will all engineered biologicals be so welcome in the future?

The Department of Defense Dependents Schools acknowledges the challenge presented by life in a technological era. It accepts responsibility to help prepare individuals to adapt to accelerated change and continued progress in the fields of science and technology. Accordingly, it has identified those key skills necessary for productive living in today's world and incorporated them into its entire K-12 science program.

Included among the skills that DoDDS chooses to emphasize are problem solving, decision making, evaluating, and application of understandings in a science context.

When equipped with these skills, DoDDS students can more successfully confront the complexity of life in today's world. These skills will help students better anticipate a likely future for themselves - one in which they behave with greater self assurance because they have developed a greater capacity to understand and control their own fate.

Introduction

This statement of science objectives was developed by DoDDS elementary classroom teachers, science teachers, and science coordinators to serve the school system in two major ways:

- As the framework for science instruction, K-12.

- As the basis for evaluating learner outcomes in relation to the following DoDDS science program emphases:

  1. The application of science processes to solve problems, make decisions, and increase understanding.

  2. The utilization of the content and concepts of the biological, physical, and earth/space sciences.

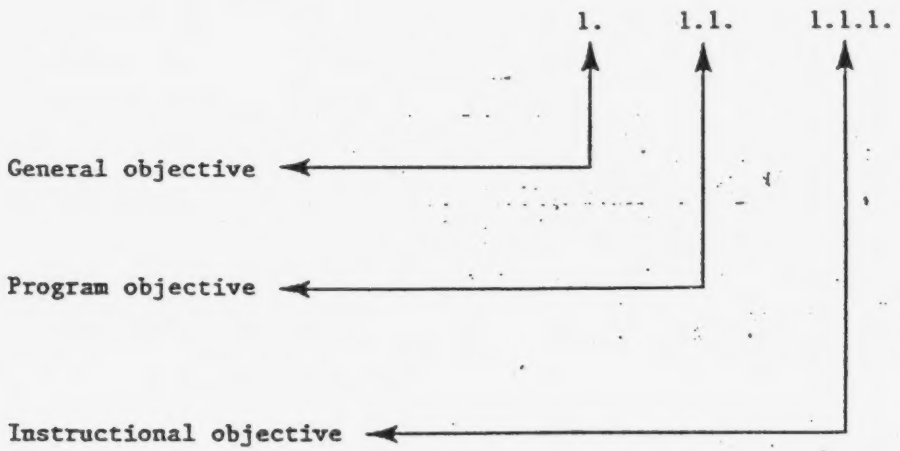
  3. The evaluation of the role of science and technology in society.

  4. The exhibition of scientific behavior in school and everyday life.

To ensure that each of the four program emphases receives adequate support in all grade levels and courses, teachers and administrators are expected to utilize the science objectives when teaching and evaluating the school program and the specific component courses. Where texts alone do not provide adequate support, teachers will rely upon the program and instructional objectives to design appropriate science experiences for students.

Organization and Use

Statements in this document are organized in a hierarchical system in which the most general objectives are identified by single digits while the more specific ones are identified by two or more digits as seen below:

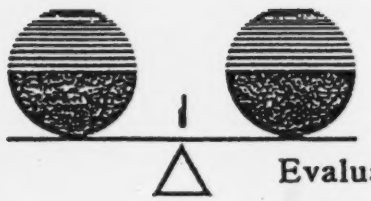


To complete this hierarchy, teachers and principals are encouraged to work together to formulate learner objectives. Learner objectives are foundational; they specify what the student should be able to do whereas the higher level objectives printed in this manual specify what teachers should be emphasizing in the science learning and skill areas.

Each instructional objective in this manual has been analyzed for appropriate grade placement. The results of the analysis are seen in the "E———P" lines opposite each instructional objective. "E" identifies the grade level at which entry level skills can be introduced. "P" marks the grade level where proficiency is expected. Levels can be adjusted on a class by class basis to meet the needs of individual students. The "E" and "P" lines also function to help teachers plan among themselves for the grade placement of particular objectives.

The instructional objectives are samples and are not meant to provide a comprehensive outline of a specific science course.

XXXX



Evaluate science processes to solve problems, make decisions, and increase understanding.

1.1 ACQUIRE INFORMATION THROUGH OBSERVATION AND MEASUREMENT.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.1.1 (K–4) Observe and report about an object or event using more than one sense.	E				P								
1.1.2 (K–8) Observe objects and events by counting, comparing, estimating, or measuring in metric units.	E								P				
1.1.3 (3–8) Identify appropriate methods of measurement for a given task.				E					P				
1.1.4 (5–8) Report observations of an object or event in at least two ways (charts, graphs, tables, verbal, written narrative, etc.)						E			P				
1.1.5 (4–12) Discuss the possibility for error in any measurement.					E								P
1.1.6 (4–12) Select tools appropriate to the phenomenon being studied (for example, thermometer, computer).					E								P

1.2 USE APPROPRIATE RELATIONSHIPS TO ORGANIZE INFORMATION.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.2.1 (1-4) Describe the location of an object within its immediate environment.		E			P								
1.2.2 (1-8) Identify properties useful for classifying objects.		E							P				
1.2.3 (2-10) Develop a classification key using observable differences.			E								P		
1.2.4 (5-8) Use angles and compass headings to communicate directions.						E			P				
1.2.5 (3-9) Describe changes in position, size,				E						P			
1.2.6 (6-12) Describe motion relative to stationary and moving objects.							E						P
1.2.7 (8-12) Describe location in terms of three dimensions and time.									E				P

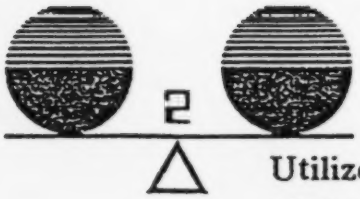
1.3 UTILIZE FACTS IN INFERENCES, HYPOTHESES, AND PREDICTION.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.3.1 (2-8) Make predictions based on measurements.			E						P				
1.3.2 (1-6) Make predictions from tables or graphs.		E					P						
1.3.3 (3-6) Distinguish between an observation and an inference drawn from that observation.				E			P						
1.3.4 (4-12) Distinguish between relevant and irrelevant information.					E								P
1.3.5 (4-10) Identify the hypothesis or question being tested in a given experiment.					E						P		
1.3.6 (5-10) Formulate an hypothesis as an "if-then" statement.						E					P		
1.3.7 (5-12) Evaluate the reliability of a prediction.						E							P
1.3.8 (8-12) Distinguish between probable and less probable inferences.									E				P

1.4 GENERATE INFORMATION THROUGH FORMULATING QUESTIONS IN A SCIENTIFIC MANNER, MANIPULATING AND CONTROLLING VARIABLES, AND DESIGNING AND CONDUCTING RESEARCH.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.4.1 (K-8) Give examples of cause and effect relations.	E								P				
1.4.2 (2-6) Answer a scientific question by collecting and examining-ing data through direct experience.			E				P						
1.4.3 (4-8) Formulate a question that can be answered by science activity.					E				P				
1.4.4 (4-7) Identify a variable which is deliberate-changed in an experiment.					E			P					
1.4.5 (5-8) Identify the variables which are controlled or held constant in an experiment.						E			P				
1.4.6 (7-10) Identify examples of experiments which require large sample sizes and/or many trials to be valid.								E			P		
1.4.7 (7-12) Evaluate the use of mental or computer models to explain phenomena.								E					P
1.4.8 (8-12) Design research to answer a scientific question.									E				P
1.4.9 (7-12) Identify the role of probability and chance in cause and effect situations.								E					P
1.4.10 (9-12) Evaluate a plan for answering a scientific question.										E			P

1.5 Develop critical thinking skills through problem solving.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.5.1 (K-9) State the problem (s) in a given situation.	E									P			
1.5.2 (2-5) List a sequence of steps to solve a problem.			E			P							
1.5.3 (3-12) Evaluate effectiveness of alternative solutions to problems.				E									P
1.5.4 (4-6) Acquire and verify data by comparison.					E		P						
1.5.5 (6-9) State the problem(s) in different ways.							E			P			
1.5.6 (6-12) Analyze information for relevancy.							E						P
1.5.7 (7-12) Use various methods to interpret data.								E					P

1.6 COMMUNICATE THE INTERPRETATION OF DATA.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.6.1 (4-7) State the question and conclusions of an investigation.					E			P					
1.6.2 (4-8) Use graphs to present information.					E				P				
1.6.3 (7-10) Evaluate the presentation of a research project.								E			P		

1.7 UNDERSTAND THE PERSONAL NATURE OF SCIENCE.	K	1	2	3	4	5	6	7	8	9	10	11	12
1.7.1 (K-12) Identify activities of people who work in science.	E												P
1.7.2 (K-4) List careers in science and technology.	E				P								
1.7.3 (K-12) Identify scientists and their contributions.	E												P
1.7.4 (5-9) Explore job entry requirements of careers in science and technology.						E				P			
1.7.5 (5-12) Name science-related behaviors that are important for citizens.						E							P
1.7.6 (7-12) Give examples of the interactions of a scientist and society e.g., Galileo or Einstein.								E					P
1.7.7 (7-12) Describe the creative nature of scientific activity.								E					P



Utilize the content and concepts of the biological, physical, and earth sciences.

		K	1	2	3	4	5	6	7	8	9	10	11	12
2.1	KNOW THE STRUCTURE, FUNCTION, AND BEHAVIOR OF REPRESENTIVE LIFE FORMS.													
	2.1.1 (K-4) Distinguish living from non-living things.	E				P								
	2.1.2 (K-12) Practice good health habits.	E												P
	2.1.3 (3-7) Summarize the life functions that distinguish living from non-living things.				E				P					
	2.1.4 (2-5) Identify major structural and functional characteristics of plants and animals.			E			P							
	2.1.5 (3-6) Describe adaptions of plants and animals.				E			P						
	2.1.6 (4-7) Know the elements of human nutrition.					E			P					
	2.1.7 (5-7) Describe how plant and animal cells, tissues, and systems function to maintain life.						E		P					

2.1 (Continued)	K	1	2	3	4	5	6	7	8	9	10	11	12
2.1.8 (4-7) Describe different types of growth, development, reproduction, and life cycles in plants and animals, including humans.					E			P					
2.1.9 (7-10) Describe survival behavior patterns of animals, e.g., migration, territoriality, etc.								E			P		

2.2 UNDERSTAND THE PRINCIPLES OF EVOLUTION AND HEREDITY.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.2.1 (3-7) Identify those characteristics of living things that are inherited.				E				P					
2.2.2 (4-7) Discuss similarities and differences among related individuals.					E			P					
2.2.3 (6-10) Apply the theory of heredity to predict the characteristics of offspring.							E				P		
2.2.4 (5-8) Know the broad features of fossil succession in the geologic record.						E			P				
2.2.5 (7-10) Compare scientific theories that explain the means by which plants and animals have evolved over time.								E			P		

2.3	UNDERSTAND THE INTERACTION OF PHYSICAL AND BIOLOGICAL ELEMENTS OF THE ENVIRONMENT.	K	1	2	3	4	5	6	7	8	9	10	11	12
	2.3.1 (1-4) Identify sources of energy (e.g., food) for living things.		E			P								
	2.3.2 (2-7) Describe a food chain.			E					P					
	2.3.3 (1-6) Identify environmental conditions appropriate and inappropriate for plants and animals.		E					P						
	2.3.4 (5-10) Explain requirements of photosynthesis and respiration.						E					P		
	2.3.5 (5-10) Identify causes of disease, e.g., pathogens, stress, deficiency, radiation, toxins, and heredity.						E					P		
	2.3.6 (5-10) Describe the body's defenses against diseases.						E					P		
	2.3.7 (5-10) Explain the interactions of individuals and groups in ecosystems.						E					P		
	2.3.8 (7-10) Describe the flow of energy from the sun through living organisms, including producers, consumers, and decomposers.								E			P		
	2.3.9 (7-10) Outline the principal factors that may limit population size and distribution of plants and animals, including humans.								E			P		

2.4 UNDERSTAND THE PROPERTIES AND INTERACTIONS OF MATTER AND ENERGY.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.4.1 (K-4) Identify the similarities and differences of solids, liquids, and gases.	E				P								
2.4.2 (3-5) Identify matter by its physical characteristics, e.g., hardness, bouyancy, vein patterns.				E		P							
2.4.3 (3-6) Know that energy is involved in a change of state.				E			P						
2.4.4 (4-6) Know that molecules are small particles whose presence may be detected by the senses.					E		P						
2.4.5 (6-11) Identify matter by its chemical characteristics.							E					P	
2.4.6 (5-9) Identify substances as elements, compounds, or mixtures.						E				P			
2.4.7 (6-9) State a word-model of an atom.							E			P			
2.4.8 (4-9) Give evidence for the particle nature of matter.					E					P			
2.4.9 (8-11) Give and uses of acids, bases, salts, oxides, and organic compounds.									E			P	
2.4.10 (7-10) Give examples of biochemical processes.								E			P		

2.5 UNDERSTAND THE CONCEPTS OF FORCE, MOTION, AND ENERGY.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.5.1 (1-4) Know that Forces are required for the movement of objects.		E			P								
2.5.2 (5-9) Know that forces can change an object's shape, speed, or direction.						E				P			
2.5.3 (6-9) Give examples of kinetic and potential energy.							E			P			
2.5.4 (5-9) Give examples of fundamental kinds of forces, e.g., electrical, nuclear, mechanical, and gravitational.						E				P			
2.5.5 (6-9) Explain the concept of power (rate of using energy).							E			P			
2.5.6 (9-12) Demonstrate that mass in motion has momentum and energy.										E			P

2.6 UNDERSTAND MAJOR ENERGY TRANSFORMATIONS.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.6.1 (3-6) Identify devices that change energy from one form to another.				E			P						
2.6.2 (5-9) Identify how power production systems transform energy.						E				P			
2.6.3 (9-12) Describe an energy transformation in terms of the principle of conservation of energy.										E			P
2.6.4 (9-12) Relate energy transmission to wave and particle theory.										E			P

2.7 UNDERSTAND HEAT.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.7.1 (1-4) List sources of heat.		E			P								
2.7.2 (3-6) Compare heat conductors and insulators.				E			P						
2.7.3 (9-12) Describe heat and temperature in terms of kinetic molecular energy.										E			P

2.8 UNDERSTAND LIGHT.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.8.1 (1-4) List sources of light.		E			P								
2.8.2 (5-9) Describe how visible light behaves.						E				P			
2.8.3 (6-12) Describe the behavior of reflected and refracted light.							E						P

2.9 UNDERSTAND SOUND.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.9.1 (K-4) Describe how sound is produced.	E				P								
2.9.2 (3-6) Demonstrate differences of pitch, volume, and quality of sounds.				E			P						
2.9.3 (6-9) Explain how sound is transmitted through various media.							E			P			

2.10 UNDERSTAND ELECTRICITY.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.10.1 (4-6) Identify sources of electrical energy.					E		P						
2.10.2 (2-5) Identify uses of electricity.			E				P						
2.10.3 (3-6) Describe the function of the parts of a simple electrical system.				E			P						
2.10.4 (6-9) Know how electric charges may be caused to move.							E			P			
2.10.5 (6-9) Construct series and parallel circuits.							E			P			
2.10.6 (6-9) Describe how the terms volt, ampere, watt, and kilowatt hour apply to household use.							E			P			

2.11 UNDERSTAND MAGNETISM.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.11.1 (K-3) Describe the characteristics of magnets.	E			P									
2.11.2 (6-9) Explain how magnetic fields are produced.							E			P			

2.12 UNDERSTAND THE PRINCIPLES AND CONCEPTS OF EARTH/SPACE SCIENCE.	K	1	2	3	4	5	6	7	8	9	10	11	12
2.12.1 (K-7) Describe a current space exploration activity.	E							P					
2.12.2 (2-6) Measure and predict local weather.			E				P						
2.12.3 (4-8) Describe weathering and other types of erosion.					E				P				

2.12 CONTINUED	K	1	2	3	4	5	6	7	8	9	10	11	12
2.12.4 (4-8) Relate minor geological features of the earth's surface to the distribution of plants and animals.					E				P				
2.12.5 (5-8) Describe global and local weather patterns in terms of rotation of the earth, topography, and the movement of water and air masses.						E			P				
2.12.6 (4-8) Identify the processes which change the earth's surface.					E				P				
2.12.7 (6-8) Use scientific theories to explain geologic history.							E		P				
2.12.8 (4-8) Know motions of stars, sun, planets, and satellites.					E				P				
2.12.9 (4-8) Explain how the motions of heavenly bodies affect us, e.g., days, seasons, tides, and asteroid/meteor impacts.					E				P				
2.12.10 (4-8) Demonstrate how the positions of the sun, earth, and moon, explain phases of the moon, eclipses and seasons.					E				P				
2.12.11 (8-12) Explain how climate information is utilized in managing human activities.									E				P
2.12.12 (8-12) Describe scientific theories of the origin and evolution of the universe.									E				P
2.12.13 (8-12) Discuss benefits derived from the space exploration program.										E			P

3.3 PRACTICE CONSERVATION MEASURES.	K	1	2	3	4	5	6	7	8	9	10	11	12
3.3.1 (K-12) Identify pleasant and unpleasant conditions in the personal environment.	E												P
3.3.2 (K-12) Select ways to conserve or preserve the natural and built environment.	E												P
3.3.3 (K-12) Participate in activities that improve the environment.	E												P
3.3.4 (5-12) Defend limits on the use of natural environments.						E							P

Exhibit scientific behavior in school and everyday life.

	K	1	2	3	4	5	6	7	8	9	10	11	12
4.1 UNDERSTAND THE BROAD HISTORY OF THE DEVELOPMENT OF SCIENTIFIC THOUGHT.													
4.1.1 (4-8) Describe how a science research group operates today.					E				P				
4.1.2 (7-10) Know how scientific inquiry has developed over time.								E			P		

	K	1	2	3	4	5	6	7	8	9	10	11	12
4.2 VALUE SCIENTIFIC PROCESSES.													
4.2.1 (K-12) Display appropriate safety procedures.	E												P
4.2.2 (4-7) Consider conflicting data when engaging in scientific investigations.					E			P					
4.2.3 (4-7) Seek alternative approaches to problems.						E		P					
4.2.4 (6-9) Recognize the limitations of a study.							E			P			
4.2.5 (6-9) Phrase conclusions of a study in tentative terms.							E			P			
4.2.6 (4-8) Distinguish between scientific and non-scientific explanations of phenomena.						E			P				

4.3 DISPLAY SCIENTIFIC ATTITUDES.	K	1	2	3	4	5	6	7	8	9	10	11	12
4.3.1 (K-12) Express curiosity.	E												P
4.3.2 (K-12) Demonstrate a continuing search for deeper understanding.	E												P
4.3.3 (K-12) Demonstrate respect for living things.	E												P
4.3.4 (K-12) Display confidence in ability to engage in scientific inquiry.	E												P
4.3.5 (K-12) Cooperate with others in science inquiry.	E												P
4.3.6 (5-8) Demonstrate a preference for a variety of sources.						E			P				
4.3.7 (5-12) Display reasonable skepticism of unsubstantiated conclusions.						E							P

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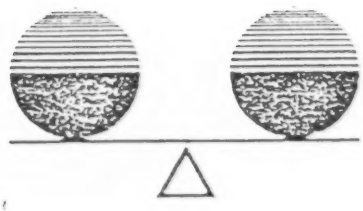

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MEMORANDUM FOR All Principals
Grades 7-12 Science Course Teachers

SUBJECT: Definition of Laboratory Science Courses and Science Laboratory Sessions

1. Background: The North Central Association (NCA) and DoDDS discuss laboratory science courses at various locations in their literature.

2. Discussion: Recently there have been discussions regarding how DoDDS-Pacific actually defines laboratory science courses and laboratory sessions.

a. A laboratory science course is defined as a science course in which at least one, one-period laboratory session is conducted each week for the duration of the course.

b. A laboratory session is defined as an entire class period during which every student enrolled in a course and present that day is involved in a "hands-on" science activity or the write-up thereof. Laboratory sessions must be related to the objectives set forth in DS Manual 2200.1, Science Objectives for 1985-1992.

These definitions apply to all science courses listed in my memorandum to you, 17 Apr 87, subject: Course Titles and Student Information Management System (SIMS) Computer Codes.

3. Action: School principals shall monitor science courses in their schools for compliance with this memorandum. Unique problems regarding the offering of science labs should be addressed to this office for assistance. Guidance provided in this memorandum shall remain current until superseded.

SIGNED
JERALD E. BLOOM
Director

cf: District Superintendent

DSPA MANUAL 2000.9
February 1987

7-12 SEQUENTIAL LEARNING GUIDE

DEPARTMENT OF DEFENSE
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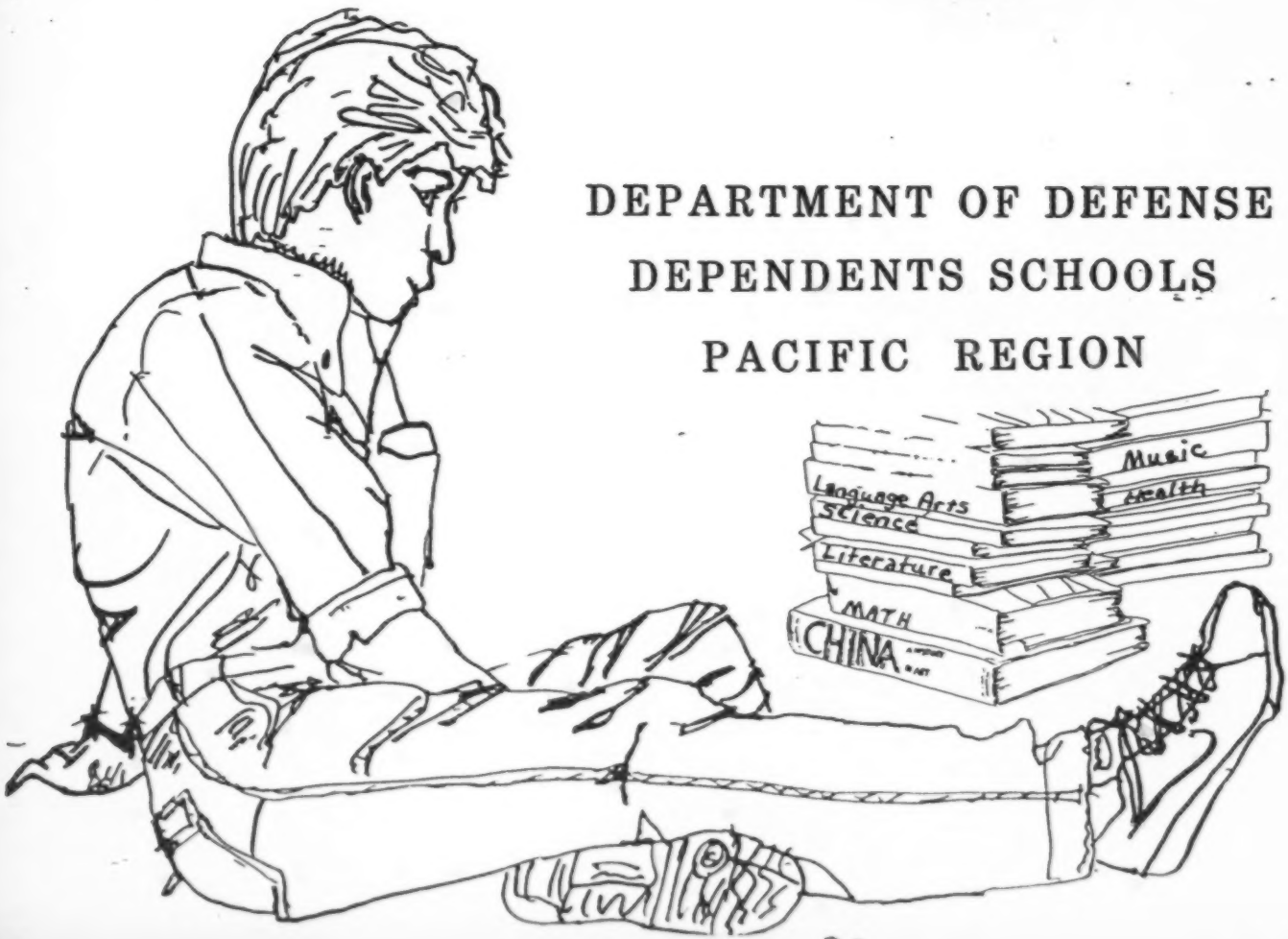

SCIENCE

Life Science

- Observe objects and events by counting, comparing, estimating, or measuring
- Describe adaptations of plants and animals to their environment
- Describe different types of growth, development, reproduction, and life cycles in plants and animals, including humans
- Understand the principles of evolution and heredity
- Identify causes of disease, e.g. pathogens, stress, deficiency, radiation, toxins, and genetic
- Outline principal factors that may limit population size and distribution of plants and animals, including humans
- Select ways to conserve natural and man-made environments

Earth Science

- Describe earth composition and structure
- Describe global and local weather patterns in terms of rotation of the earth, topography, and the movement of water and air masses
- Explain how the motion of heavenly bodies affects us; e.g. days, seasons, tides, and asteriod/meteor impacts
- Describe scientific theory of origin and evolution of the universe
- Discuss benefits derived from the space exploration program
- Identify renewable and nonrenewable natural and energy resources found on the earths environment.
- List benefits and concerns which have resulted from scientific/technological innovations

Physical Science

- Understand the properties and interactions of matter and energy
- Identify the similarities and differences among solids, liquids, and gases
- Give evidence for the particle nature of matter
- Identify matter by its physical and chemical characteristics
- Relate force, motion, energy, and power
- Know behavior of different forms of energy
- Predict a series of consequences from a scientific/technological change

Biology

- Understand the chemical and structural basis of life
- Know anatomy, physiology, and behavior of representative life forms
- Understand principles of evolution and heredity
- Identify sources of energy for living things
- Describe role of biogeochemical cycles in nature
- Explain requirements of photosynthesis and respiration
- Explain interactions of individuals and groups in ecosystems
- Outline principal factors that may limit population size and distribution of plants and animals, including humans
- Analyze current issues of science and technology and their impact on people and other organisms
- Generate information by designing and conducting a simple research experiment

Chemistry

- Explain solutions and solubility
- Explain atomic theory
- Determine chemical reactions including energy changes and mole method
- Explain kinetic theory of gases, liquids, and solids
- Explain solutions and solubility
- Know and use periodic table of the elements
- Employ chemical bonding theory
- Understand ionization energy and electron energy levels explaining chemical characteristics
- Predict rates of reaction
- Describe equilibrium and equilibrium factors
- Understand oxidation-reduction chemical reactions
- Give examples and uses of acids, bases, salts, oxides, and organic compounds

Physics

- Understand nature and interactions of matter and energy and relativity theory
- Apply concepts of force, motion, and energy
- Understand energy transformations including radioactivity
- Understand heat, light, and sound
- Understand competition of ideas between earth-centered and sun-centered astronomy
- Understand classical mechanics and quantum mechanics models
- Understand magnetism, static and current electricity
- Understand interactions between electricity and magnetism and the role of electromagnetic wave motion
- Understand electronics of basic technology and current communications systems

Advanced Biology

- Make an indepth investigation into any of the following fields:

Anatomy and Physiology	Botany
Microbiology	Ecology
Histology	Genetics
Oceanography	Zoology
Comparative Anatomy	

- Learn various laboratory techniques involved in above investigations; i.e., slide preparation and fixation, microphotography, plant and animal dissection, sampling of organisms, etc.
- Individually design and conduct an experiment with production of a scientific research paper

Oceanography

- Describe major physical features and development of the oceans and their basins
- Examine properties of seawater and the effects of seawater on ocean and marine life
- Describe life in the sea
- Understand structure and dynamics of the marine ecosystem
- Describe physical characteristics and effects of oceanic processes in the open ocean and the coastal ocean
- Understand factors that control our ocean resources

SCIENCE

Course Title: Life Science

Computer Title: LIFE SCIENCE

Computer Code: SCB101

Grade Level: 7

Prerequisites: None

Length of Course: 36 Weeks

Major Concepts/Content: The purpose of this course is to acquaint students with the scientific study of the structure and function of living organisms and their ecological relationships. Practical implications and meaningful everyday applications are emphasized. Attention is given to important principles and concepts that serve collectively as a framework for understanding and interpreting the general characteristics of life evident in every organism and those special characteristics that distinguish one species from another. The various topics students will study are: plants, animals, simple organisms, human life, heredity and evolution, and ecology and conservation.

Major Instructional Activities: Instruction and learning activities in this course are staged in a lecture and a laboratory setting. Learning-through-doing laboratory experiences are designed to explore science through a stimulating yet simple approach toward each topic. Based on the philosophy that scientific knowledge is acquired through activity and experimentation, the course has many laboratory experiences designed to reinforce life science concepts.

Major Evaluative Techniques: Written, oral, and laboratory tests will be used to measure student achievement of the course objectives and to reinforce student learning, evaluate progress, and discover areas of weakness. Laboratory and classroom work participation will evaluate higher level thinking skills progress.

Essential Objectives:

* Observe objects and events by counting, comparing, and estimating or measuring.
* Describe adaptations of plants and animals to their environment.
* Describe different types of growth, development, reproduction, and life cycles in plants and animals, including humans.
* Understand the principles of evolution and heredity.
* Identify causes of disease; e.g., pathogens, stress, deficiency, radiation, toxins, and genetic.
* Outline principal factors that may limit population size and distribution of plants and animals, including humans.
* Select ways to conserve natural and built environment.

Course Title: Earth Science

Computer Title: EARTH SCI

Computer Code: SCL201

Grade Level: 8

Prerequisites: None

Length of Course: 36 Weeks

Major Concepts/Contents: The purpose of this course is to emphasize the constant changes taking place on earth. These changes affect the crustal material, land forms, rock structure, and life itself on the earth. Important concepts are treated historically and logically. Attention is given to important principles and concepts that serve collectively as a framework for understanding and interpreting the general characteristics of earth and earth's matter. The various topics students will study are: mapping and map reading, earth matter, air and water, earth surface processes, landforms and continental drift, geologic time, environmental resources, and solar system and astronomy.

Major Instructional Activities: The earth science course has a learning-by-doing program of activities in addition to the information acquired from lectures and the textbook. Scientific knowledge about the earth and its atmosphere is studied through many various individual activities. These activities can be conducted in the classroom and in the school yard. Activities are designed to focus on science content while reinforcing reading and math skills. The major areas of concentration also include improvement of graphing and problem solving skills.

Major Evaluative Techniques: Student attainment of course objectives will be evaluated through written and oral examinations, laboratory experiments, and class participation.

Essential Objectives:

* Understand principles of map reading as it pertains to the physical surfaces of the world, other planets, and satellites.
* Describe earth composition and structure.
* Identify renewable and nonrenewable natural and energy resources found in the earth's environment.
* Describe global and local weather patterns in terms of rotation of the earth, topography, and the movement of water and air masses.
* Explain how the motion of heavenly bodies affects us; e.g., days, seasons, tides, and asteroid/meteor impacts.
* Describe scientific theory of origin and evolution of the universe.
* Discuss benefits derived from the space exploration program.
* List benefits and concerns which have resulted from scientific/technological innovations.

Course Title: Physical Science

Computer Title: PHYSICAL SCI

Computer Code: SCP301

Grade Level: 9-12

Prerequisites: None

Length of Course: 36 Weeks

Major Concepts/Content: The purpose of this course is to introduce matter and energy and their relation to each other. Everyday applications of physical laws and principles are emphasized to explain everyday occurrences and technological advances throughout history. Topics to be covered are: measurement and motion; classification, patterns, and changes that take place in matter; light and sound energy; and energy resources.

Major Instructional Activities: Many varied laboratory activities are conducted by students in this course to reinforce physical science concepts presented in the textbook and lectures. These activities enable students to generate organized and well-thought-out laboratory reports. Special attention will be given to safety practices during laboratory sessions and each student will be expected to adhere to proper safety procedures.

Major Evaluative Techniques: Student attainment of course objectives will be evaluated through written examinations, class participation, laboratory experiments, home assignments, and special projects.

Essential Objectives:

* Understand the properties and interactions of matter and energy.
* Identify the similarities and differences among solids, liquids, and gases.
* Give evidence for the particle nature of matter.
* Identify matter by its physical and chemical characteristics.
* Relate force, motion, energy, and power.
* Know behavior of different forms of energy.
* Predict a series of consequences from a scientific/technological change.
* Develop a systematic approach to laboratory work and scientific study.
* Understand the importance of careful observation and procedures to obtain valid results.

Course Title: Biology I

Computer Title: BIOLOGY I

Computer Code: SCB401

Grade Level: 10-12

Prerequisites: None

Length of Course: 36 Weeks

Major Concepts/Content: The purpose of this course is to introduce the study of living things. Therefore, the understanding of life and life processes depends upon mastering the unifying principles and concepts applicable to all life forms. Topics are studied from the simplest to the most complex levels of biological organization. The life processes of organisms from different kingdoms are compared so that adaptations necessary to carry out life functions can be understood. Some of the topics that will be covered in the Biology course throughout the year are: classification of plants and animals, characteristics of life, heredity and evolution, diversity of plant and animal kingdoms, simple organisms, plants and animals, and biological influences on the environment.

Major Instructional Activities: High school Biology incorporates lectures with a practical, workable laboratory program. Students learn firsthand the value of making accurate observations and data recording to arrive at valid conclusions in investigations.

Major Evaluative Techniques: Specific performance objectives have been identified for each topic covered. Frequent oral and written testing of material covered in lectures and laboratory experiences will evaluate student progress and reinforce student learning. Student attainment of course objectives will be evaluated through written and oral examinations, laboratory experiments, laboratory techniques, special reports, and class participation.

Essential Objectives:

* Understand the chemical and structural basis of life.
* Know anatomy, physiology, and behavior or representative life forms.
* Understand principles of evolution and heredity.
* Identify sources of energy for living things.
* Describe role of biogeochemical cycles in nature.
* Explain requirements of photosynthesis and respiration.
* Explain interactions of individuals and groups in living systems.

Course Title: Chemistry I

Computer Title: CHEMISTRY I

Computer Code: SCC501

Grade Levels: 10-12

Prerequisite: Algebra I

Length of Course: 36 Weeks

Major Concepts/Content: The purpose of this course is to introduce the study of such chemistry topics as atomic theory, atomic structure and chemical bonding, principles of chemical reactions, and molecular structure.

Major Instructional Activities: Fundamental chemistry concepts are introduced early in the course, then developed and utilized later as the student becomes more confident with the concepts being introduced. Laboratory experiments are used to introduce topics. Major emphasis is placed on problem solving. Exercises, questions, laboratory activities, and problems are assigned regularly so that the fundamental concepts are deliberately and pointedly used again and again.

Major Evaluative Techniques: Student attainment of course objectives will be evaluated through written examinations, written and oral laboratory reports, solutions to assigned questions and problems, and class participation.

Essential Objectives:

* Explain solutions and solubility.
* Know and use periodic table of the elements.
* Employ chemical bonding theory.
* Understand ionization energy and electron energy levels explaining chemical characteristics.
* Predict rates of reaction.
* Describe equilibrium and equilibrium factors.
* Recognize acids, bases, and salts.
* Understand oxidation reduction chemical reactions.
* Describe carbon compounds and reactions.

Course Title: Physics I

Computer Title: PHYSICS I

Computer Code: SCP501

Grade Level: 11-12

Prerequisites: Algebra I

Length of Course: 36 Weeks

Major Concepts/Content: The purpose of this course is to provide an understanding of the physical laws fundamental to all sciences. Basic concepts and ideas about matter and energy illustrate how these basics clarify more complex concepts. These basics are introduced to students in a logical and carefully planned sequence. Fundamental laws of mechanics (forces and motion) are developed early as well as problem-solving techniques. Subsequent topics depend upon this early development of mechanics to further develop other natural laws. Some of the topics covered in Physics will be measurement, forces and motion, wave theory, heat, sound, light, magnetism, electricity, atomic structure, nuclear reactions, and high-energy physics.

Major Instructional Activities: There are many laboratory experiences in physics which will reinforce the concepts presented during lectures, demonstrations, and problem-solving sessions. Special attention is given to the mathematical treatment of data taken from physical changes occurring in matter and energy forms.

Major Evaluative Techniques: Quizzes, chapter examinations, and semester examinations are given to assess student progress. Written laboratory reports and assigned questions and problems may be used to determine the concepts that have not been mastered.

Essential Objectives:

* Understand nature and interactions of matter and energy and relativity theory.
* Apply concepts of force, motion, and energy.
* Understand major energy transformations including radioactivity.
* Understand heat, light, and sound.
* Understand competition of ideas between earth-centered and sun-centered astronomy.
* Understand change from classical mechanics to quantum mechanics.
* Understand magnetism and static and current electricity.
* Understand interactions between electricity and magnetism and the role of electromagnetic wave motion.
* Understand electronics of basic technology and current communications.
* Give evidence of the particle nature of matter.

Course Title: Biology II

Computer Title: BIOLOGY II

Computer Code: SCB501

Grade Level: 11-12

Prerequisites: Biology I

Length of Course: 18 - 36 weeks

Major Concepts/Content: Advanced Biology is an elective course for students with a special interest and high motivation for an in-depth study of the biological sciences. For all topics, the emphasis is on laboratory investigation. Topics in Advanced Biology include, but are not limited to, unity of life, microtechniques, cellular energenics and genetics, including chromosome mapping, karyotyping, transduction, and cloning. The course includes land plants; vertebrate physiology and development; evolution including speciation, isolating mechanisms, and adaptations of species, and ecology including interspecific and intraspecific competition, and behavior.

Major Instructional Activities: Advanced Biology builds on the concepts and principle material covered in the standard high school Biology course with greater detail in content and with additional topics and laboratoy investigations. Much of the content in Advanced Biology will be left to the student to find on his/her own or through individual research. Students will be expected to produce projects in the form of written reports using accepted format and research skills.

Major Evaluative Techniques: Students will be evaluated upon the way they practice day-to-day scientific behavior using accepted laboratory procedures and techniques. Well-written research and laboratory experiences will be expected of each student. While there will be less content recall used in evaluation, the processes of science will be examined very carefully in evaluating students.

Essential Objectives:

* Learn different problem-solving strategies in the life sciences.
* Employ proper procedures for collecting, analyzing, and organizing raw data.
* Use special techniques in the laboratory.
* Use special equipment and instruments unique to biological studies.
* Identify legal, humanistic, and social issues affecting immediate and global environments.
* Prepare and present results of experimental activity using one or more media, oral communication, and the techniques of acceptable scientific writing.

Course Title: Chemistry II

Computer Title: CHEMISTRY II

Computer Code: SCC601

Grade Level: 11-12

Prerequisites: Chemistry I

Length of Course: 18 - 36 weeks

Major Concepts/Content: Chemistry II is an elective course for students with a special interest and high motivation for an in-depth study of the chemical sciences. For all topics, the emphasis is on laboratory investigation. Topics in Chemistry II include, but are not limited to, stoichiometry, solution chemistry (qualitative and quantitative), chemical kinetics, thermodynamics, electrochemistry, quantum, organic, and biochemistry.

Major Instructional Activities: Chemistry II builds on the concepts and principle material covered in the standard high school Chemistry course with greater detail in content and with additional topics and laboratory investigations. Much of the content in chemistry will be left to the student to find on his/her own or through individual research and problem solving. Students will be expected to produce projects in the form of written reports using accepted format and research skills.

Major Evaluative Techniques: Students will be evaluated upon the way they practice day-to-day scientific behavior using accepted laboratory procedures and techniques. Well-written research and laboratory experiences will be expected of each student. While there will be less content recall used in evaluation, the processes of science will be examined very carefully in evaluating students.

Essential Objectives:

* Learn different problem-solving strategies in the chemical sciences.
* Employ proper procedures for collecting, analyzing, and organizing raw data.
* Use special techniques in the laboratory
* Use special equipment and instruments unique to biological studies.
* Identify legal, humanistic, and social issues affecting immediate and global environments.
* Prepare and present results of experimental activity using one or more media, oral communication, and the techniques of acceptable scientific writing.

Course Title: Physiology

Computer Title: PHYSIOLOGY

Computer Code: SCB601

Grade Level: 11-12

Prerequisites: Biology I

Length of Course: 18 - 36 weeks

Major Concepts/Content: Physiology is an elective course for students with a special interest and high motivation for an in-depth study of the normal functions of the structural and nonstructural parts of living things. For all topics, the emphasis is on laboratory investigation. Topics in Physiology include, but are not limited to, bones and muscles, the nervous, digestive, respiratory, circulatory, excretory, endocrine, reproductive systems, and genics.

Major Instructional Activities: Physiology builds on the concepts and principle materials covered in the standard high school Biology course with greater detail and emphasis on study of the structure and systems of the human body in laboratory investigations. Much of the content in Physiology will be left to the student to find on his/her own or through individual research and problem solving. Student will be expected to produce projects in the form of written reports using accepted format and research skills.

Major Evaluative Techniques: Students will be evaluated upon the way they practice day-to-day scientific behavior using accepted laboratory procedures and techniques. Well-written research and laboratory experiences will be expected of each student. While there will be less content recall used in evaluation, the processes of science will be examined very carefully in evaluating students.

Essential Objectives:

* Learn different problem-solving strategies in the chemical sciences.
* Employ proper procedures for collecting, analyzing, and organizing raw data.
* Use special techniques in the laboratory
* Use special equipment and instruments unique to biological studies.
* Identify legal, humanistic, and social issues affecting immediate and global environments.
* Prepare and present results of experimental activity using one or more media, oral communication, and techniques of acceptable scientific writing.

Course Title: Physics II

Computer Title: PHYSICS II

Computer Code: SCP601

Grade Level: 11-12

Prerequisites: Physics I

Length of Course: 18 - 36 weeks

Major Concepts/Content: Physics II is an elective course for students with a special interest and high motivation for an in-depth study of the physical sciences. For all topics, the emphasis is on laboratory investigation. Topics in Physics II include, but are not limited to, measurement (direct and indirect), matter and energy, kinematics and dynamics, force vector resolution, astronomical physics history, orbital mechanics, planetary gravitation, heat measurement and exchange, heat transfer and applications, wave nature and interactions, refraction, relection, diffraction and polarization of light and sound, electrostatics, DC and AC circuitry, electrostatic induction, atomic structure, nuclear reations, and particle physics.

Major Instructional Activities: Physics II builds on the concepts and principle material covered in the standard high school physics course with greater detail in content and with additional topics and laboratory investigations. Much of the content in physics will be left to the student to find on his/her own or through individual research and problem solving. Students will be expected to produce projects in the form of written reports using accepted format and research skills.

Major Evaluative Techniques: Students will be evaluated upon the way they practice day-to-day scientific behavior using accepted laboratory procedures and techniques. Well-written research and laboratory experiences will be expected of each student. While there will be less content recall used in evaluation, the processes of science will be examined very carefully in evaluating students.

Essential Objectives:

* Learn different problem-solving strategies in the chemical sciences.
* Employ proper procedures for collecting, analyzing, and organizing raw data.
* Use special techniques in the laboratory
* Use special equipment and instruments unique to biological studies.
* Identify legal, humanistic, and social issues affecting immediate and global environments.
* Prepare and present results of experimental activity using one or more media, oral communication, and the techniques of acceptable scientific writing.

Course Title: Science-Technology-Society

Computer Title: SCI TECH SOC

Computer Code: SCZ501

Grade Level: 11-12

Prerequisites: None

Length of Course: 36 Weeks

Major Concepts/Content: This laboratory oriented science course teaches science process and thinking skills in a social issued context. The course utilizes the newly developed DoDDS Science, Technology, and Society modules. Units currently in use in this course involve the student in an interdisciplinary scientific investigation in the following areas: Endangered species, biomedical technology, transportation, energy, consumerism, population dynamics, water resources, community planning, space exploration and settlement, and public health.

Major Instruction Activities: Lecture, demonstration, laboratory investigation, field and community investigation, role play and simulation, computer simulation and computer-data analysis. A major emphasis is placed on collecting, analyzing, and making valid inferences from real data.

Major Evaluative Techniques: Lab and field practical examinations, written reports, monitoring of lab and field notebooks, research logs and computer simulation reports, class participation in discussion and role elaboration, quizzes and exams. Formative peer evaluation of group inquiry skills is utilized by each inquiry team as a means of improving the group effectiveness.

Essential Objectives: The course focuses on developing a student's understanding of the enterprise of scientific inquiry in the context of contemporary problems in the various disciplines of science, technology, and the social sciences. A major goal is to help prepare students acquire relevant information and make responsible decisions. Much of the developmental focus is in the strengthening of the higher order inquiry skills that one would use as a scientist, technologist, or scientifically literate citizen. In addition, through this course students become intimately involved with science related social issues and recognize technology-related options and consequences.

Software for Computer Applications: Special software has been designed for the Atari computer for this course. Additional public health domain software is available for Apple and Commodore computers.

Course Title: AP Biology

Computer Title: AP BIOLOGYY

Computer Code: SCB612

Grade Level: 11-12

Prerequisites: Biology I

Length of Course: 36 Weeks

Course Title: AP Chemistry

Computer Title: AP CHEMISTRY

Computer Code: SCC612

Grade Level: 12

Prerequisites: Chemistry I

Length of Course: 36 Weeks

Course Title: AP Physics B

Computer Title: AP PHYSICS B

Computer Code: SCP612

Grade Level: 12

Prerequisites: Physic I

Length of Course: 36 Weeks

Course Title: AP Physics C

Computer Title: AP PHYSICS C

Computer Code: SCP613

Grade Level: 12

Prerequisites: AP Physics B

Length of Course: 36 Weeks

The course description for advanced placement courses published by College Boards are to be utilized for the course entered above.

Course Title: Astronomy

Computer Title: ASTRONOMY

Computer Code: SCZ502

Grade Level: 10-12

Prerequisites: None

Length of Course: 18 Weeks

Major Concepts/Content:
Motions: Moon, planets, sun, starts, galaxies,
Observations: Visual, telescopes, radio, electromas
Structures: Solar system, galaxy, stars, universe
Processes: Life cycle mass, temp, pressure age

Major Instructional Activities:

Computer usage
Class lectures
Night and day labs
Measurement processes

Major Evaluative Techniques:

Tests
Labs
Quizzes
Class participation

Essential Objectives:

Relate mass, temp, age, and pressure to cycles
Describe location i relation among planets, stars, gala
Relate location to planet orbit period.

Course Title: Marine Biology

Computer Title: MARINE BIO

Computer Code: SCZ602

Grade Level: 11-12

Prerequisites: Successful completion of SCB401 and permission of the instructor or completion of SCB401 and SCC501 with grades of C or better.

Length of Course: 36 Weeks

Major concepts/Contents: Marine Biology introduces students to: identification and classification of organisms most common to the region in which the course is offered (or marine biological taxonomy in general); basic ecological concepts of the sandy beach, rocky shore, and benthic communities; seaweeds; planktonic forms; plankton and their relationship to marine life cycles; nekton; benthos; marine bacteriology; marine biological resources; marine pollution. Selected special topics may be included.

Major Instructional Activities: INstructional activities in the course include but are not limited to: lectures, demonstrations, field trips, field investigations, laboratory investigations, special projects of a laboratory, a field, and a computer nature.

Evaluation Techniques: Students are evaluated to determine their competence with course and DoDDS Science Objectives through written and oral quizzes; laboratory activities; laboratory exams; success on field projects; class participation, quality of laboratory and field notebooks; and other methods as may be deemed appropriate by the instructor.

Essential Objectives:

* Describe how information is acquired through observations and measurements of marine phenomena.
* Demonstrate a manifestation of critical thinking skills by solving marine biologically oriented problems.
* Describe the structure, function, and behavior of representative marine life forms.
* Describe interactions between physical and biological events occurring in the marine environments.
* Identify and describe major energy transformations in the marine environment.
* Analyze current issues in marine science and technology.
* Describe the impact of current marine oriented issues upon human and other populations.

Course Title: Science Research

Computer Title: SCIENC RESEA

Computer Code: SCZ405

Grade Level: 9-12

Prerequisites: None

Length of Course: 36 Weeks

Major Concepts/Content: Students will be taught the science research method through exposure to articles dealing with scientific studies, discussions of possible spin-offs as a result of these studies, researching areas of interest as a group and as individuals, and writing proposals for future studies. The proposal includes an introduction, background research, and methods and procedures. Students who choose to take science research will complete the proposed study and write the results and conclusions.

Major Instructional Activities: Students learn to report original research. The Learn to critique research articles and to design their own research. They write individual reports of a study completed during the course by the group. The Science Seminars held in the fall are available to these students as enrichment. They also research an area of interest and write a proposal for a future study.

Major Evaluative Techniques: Evaluation is based on the oral and written critiques of research articles, discussion in class over these articles, final written proposals, and research papers of their individual and group studies, and the methods and procedures followed in these studies.

Essential Objectives:

- Examine current research published in newspapers and journals.
- Identify an area of interest of the group.
- Conduct the study as a group.
- Report the study individually in a written format to include an introduction, background research, methods and procedures, results, conclusions, and a reference list.
- Identify an individual area of interest.
- Research that area and design an original study.
- Write a proposal to include an introduction, background research, methods and procedures, and a reference list.

Course Title: Oceanography

Computer Title: OCEANOGRAPHY

Computer Code: SCZ603

Grade Level: 11-12

Prerequisites: Successfully completion of SCB401 and permission of the instructor or completion of SCB401 and SCC501 with grades of C or better.

Length of Course: 36 Weeks

Major Concepts/Content: Oceanography is a combination science of physics, chemistry, geology, and biology of the oceans. Students investigate plate tectonics; properties of sea water; salinity; temperature, density, and minerals of the oceans; Coriolis force; currents and circulation in the world ocean; tide and wave fundamentals, esturyn types, marine biological topics; history, tools, instruments and experimental methods of oceanography.

Major Instructional Activities: Instructional activities in this course include but are not limited to: lectures, demonstrations, field trips, field investigations, laboratory investigations, special projects of a laboratory, a field, and a computer nature.

Major Evaluative Techniques: Students are evaluated to determine their competence with course and DoDDS Science Objectives through written and oral quizzes; laboratory activities; laboratory exams; success on field notebooks; and other methods as may be deemed appropriate by the instructor.

Essential Objectives:

* Describe how information is acquired through observations and measurements of marine phenomena.
* Demonstrate a manifestation of critical thinking skills by solving marine physical biological and chemical problems.
* Describe the structure, function, and behavior of representative marine life forms, especially in the planktonic community.
* Describe interactions between physical, biological, and chemical events occurring in the various marine environments.
* Identify and describe major energy sources and interactions in the marine environment.
* Analyze current issues in ;marine science and technology.
* Describe the impact of current marine oriented issues upon man.
* Describe the structure of the world ocean and its basin.

DEPARTMENT OF DEFENSE
DEPENDENTS SCHOOLS
FUTENMA BOX 796
FPO SEATTLE 98772-0005

18 August 1989

PACIFIC

ERH/635-2151/303-11

MEMORANDUM FOR All Principals

SUBJECT: 1989-90 Approved Textbook Listing

Attached is the DoDDS-Pacific Approved Textbook Listing. It is organized by curriculum areas with titles, publishers and copyright dates.

These adoptions represent the only texts authorized for purchase and use as the core for basic programs in the Pacific Region schools. Previously adopted or suppplementary texts will not be used in lieu of the authorized basic texts. As implementation of new programs becomes effective, excess previously adopted texts are to be removed from the school in accordance with existing disposal procedures when sufficient replacement copies of newly adopted texts have been received.

The maximum of 25 copies of a previously adopted text may be retained by the school. In addition, 25 copies of given supplemental texts may be purchased or used for enrichment or remediation. Any exception to this policy, to include textbooks for DoDDS-P approved course offerings not listed, must be authorized at the regional level, ATTN: Education Division.

Your suggestions as to improvements in the organization of this document are greatly appreciated.

Lee Davis

LEE DAVIS, Chief
Education Division

Enclosure:
DoDDS-Pacific Approved Textbook Listing

cf: Dist Supts

SCIENCE

Grade Level	Title	Publisher	Copyright Date
K	Addison-Wesley Science	Addison-Wesley	1984
1-6	HBJ Science	Harcourt Brace Jovanovich	1985
7	Focus on Life Science	Merrill	1984
7	Focus on Life Science: A Learning Strategy for the Laboratory	Merrill	1984
8	Focus on Earth Science	Merrill	1984
8	Focus on Earth Science: A Learning Strategy for the Laboratory	Merrill	1984
9	Focus on Physical Science	Merrill	1984
9	Focus on Physical Science: A Learning Strategy for the Laboratory	Merrill	1984
10	Biology: Living Systems	Merrill	1983
10	Biology: An Everyday Experience	Merrill	1981
10	Probing Levels of Life: A Laboratory Manual	Merrill	1983
10	Laboratory Biology: Investigating Living Systems	Merrill	1983
10	Biology: Laboratory Experiences	Merrill	1985
11	Chemistry: A Modern Course	Merrill	1983
11	Laboratory Chemistry	Merrill	1983
11	Solving Problems in Chemistry	Merrill	1983
12	Modern Physics	Holt, Rinehart and Winston	1984
12	Modern Physics: Exercises and Experiments in Physics	Holt, Rinehart and Winston	1984

NCA

Standards for Secondary Schools

"The purpose of the Association shall be the development and maintenance of high standards of excellence for universities, colleges, and schools, the continued improvement of the educational program and the effectiveness of instruction on school and college levels through a scientific and professional approach to the solution of educational problems, the establishment of cooperative relationships between the schools and colleges and universities within the territory of the Association, and the maintenance of effective working relationships with other educational organizations and accrediting agencies." (Articles of Incorporation of the North Central Association)

Commission on Schools
North Central Association
Post Office Box 18
Boulder, Colorado 80306

Cooperative Action for Quality Education

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variations from Standards 3.31 through 3.38 may be approved without citation in a school enrolling such a uniquely constituted student body that a different distribution is desirable.

3.31 **Language Arts** *(such as English, reading, speech, journalism)* 4 units

3.32 **Science:** 4 units.

3.33 **Mathematics:** 4 units.

3.34 **Social Studies:** 4 units.

3.35 **Foreign Languages:** at least 2 units of 1 foreign language.

3.36 **Fine Arts:** At least 1 unit in art and 1 unit in music. Instruction in unified humanities courses, if they include content in music and art, may be substituted for these areas.

3.37 **Practical Arts** *(such as business, industrial or vocational courses, homemaking, agriculture)* 4 units

3.38 **Health and Physical Education:** 1 unit.

Exemplary Criteria

(The meeting of Exemplary Criteria is not required for NCA membership. Exemplary Criteria suggest directions or objectives for those schools that meet or exceed the minimum standards.)

—The program of studies exceeds the prescribed minimums.

—Specific programs have been implemented for reducing the student drop-out rate and for assisting withdrawn students to complete their high school education.

—Credit and non-credit educational programs are available to adults.

STANDARD IV
PROFESSIONAL STAFF

The school shall be staffed by teachers who are well qualified in professional and subject matter areas, actively encouraged by the school system to improve their competencies, involved in those areas of decision-making affecting the school program, and teaching under conditions favorable to good morale.

Teachers

4.10 **Degree and Legal Standards:** Teachers shall hold a baccalaureate degree from an institution accredited by a regional accrediting association and shall meet the legal standards for teachers in the state in which they are employed.

Graduates of non-accredited institutions may have their undergraduate work validated by admittance to graduate standing and completion of a minimum of 5 semester hours of credit in a regionally-accredited graduate college.

Credentials from a foreign university shall be accepted only after they have been evaluated by a regionally-accredited baccalaureate degree granting institution, a state department of education, or an appropriate credentials evaluating service and the work is declared the equivalent of similar work in an American institution.

4.11 **Graduate Work from Accredited Institutions:** Wherever in these standards graduate work is required, the work must have been taken in a regionally-accredited institution. Work in a foreign university shall be accepted only if the work is evaluated by the graduate division of a regionally-accredited university, a state department of education, or an appropriate credentials evaluating service and is declared the equivalent of similar graduate work in an American institution.

4.20 **General Preparation:** All teachers shall have at least 40 semester hours of work in general education well distributed over such fields as English, history, social science, mathematics, fine arts, languages, science, philosophy, religion, and psychology.

4.30 **Professional Preparation:** All teachers shall have had student teaching or shall have served an internship as part of an approved teacher education program in a higher education institution accredited by one of the six regional accrediting associations and shall have satisfactorily completed

course work in such areas as the learning process, measurement, philosophy, psychology, social foundations, and curriculum totaling at least 18 semester hours. Satisfactory teaching experience may be substituted for the student teaching requirement where state certification permits.

When teaching experience is offered in lieu of student teaching, up to 6 hours of professional preparation shall be waived, in accordance with the practice prevailing in the specific state and provided the teacher is fully certificated by the state.

Teaching Field or Subject

Teachers in the following fields shall have the minimum number of semester hours of credit hereinafter prescribed in order to qualify for teaching assignments in their respective fields.

A teacher may qualify to teach a certain subject by taking and passing a proficiency examination provided an accredited college certifies that the teacher has demonstrated competency equal to that attained by completion of the required preparation.

4.40 **Agriculture:** 24 semester hours in agriculture.

4.41 **Art:** 24 semester hours in art.

4.42 **Business:** 24 semester hours in business with at least 1 college course in each high school subject to which the teacher is assigned.

4.43 **English:** 24 semester hours in English, distributed appropriately among courses in literature or composition. Five semester hours in speech and/or journalism may be counted toward meeting this requirement.

4.44 **Foreign Languages:** 20 semester hours in each foreign language to which a teacher is assigned. One semester hour may be granted for each unit of high school foreign language, but not to exceed 2 hours.

4.45 **Health:** 20 semester hours in health, or a major in a specific teaching field with at least 8 hours in health-related subjects.

4.46 **Home Economics:** 24 semester hours in home economics.

4.47 **Humanities:** 24 semester hours of courses distributed appropriately among subjects included in the course. Because humanities courses often include such areas as art, music, literature, philosophy, and social studies, members of a team

responsible for the course shall be qualified in the areas they are teaching.

4.48 **Industrial Arts:** 20 semester hours in industrial arts including at least 1 course in each subject taught.

Teachers of drafting, general drawing, or mechanical drawing shall be approved under this standard. They may also qualify by combining art and/or industrial arts to total 20 semester hours. Individuals who have qualified in the field need only 5 semester hours in drawing.

4.49 **Interdisciplinary Studies:** 24 semester hours distributed appropriately among the subjects included in the core or block-of-time.

4.50 **Journalism:** 24 semester hours in journalism or a minimum of 5 semester hours in journalism plus sufficient additional work in related fields to total at least 24 semester hours.

4.51 **Mathematics:** 20 semester hours of credit in mathematics. One semester hour may be allowed for each unit of high school mathematics, but not to exceed 2 hours.

4.52 **Music:** 24 semester hours in music, with course work appropriate to the teacher's assignment.

4.53 **Physical Education:** 20 semester hours in physical education.

4.54 **Reading:** 24 semester hours in reading or a minimum of 5 semester hours in reading plus sufficient additional work in English and/or related fields to total at least 24 semester hours.

4.55 **Religious Studies** (Non-doctrinal): A teacher of non-doctrinal religious studies shall meet the NCA requirements for a teacher of English, social studies, or humanities, with at least 6 semester hours in religious studies appropriate to the specific courses being taught by the teacher.

4.56 **Science:** 24 semester hours in science, distributed appropriately in the subjects to which the teacher is assigned. Teachers of highly specialized elective subjects shall have had training and/or experience sufficient to qualify them for assignment to teach such specialized electives, subject to the approval of the State Committee.

4.57 **Social Studies:** 24 semester hours in social studies, distributed appropriately in the subjects to which the teacher is assigned. Teachers of highly specialized elective subjects shall have had training

and/or experience sufficient to qualify them for assignment to teach such specialized electives, subject to the approval of the State Committee.

4.58 **Speech:** 24 semester hours in speech and dramatic arts or a minimum of 8 semester hours in speech plus sufficient additional work in English to total at least 24 semester hours.

4.59 **All Other Subjects:** Teachers of all other subjects for which NCA requirements have not been established shall be approved by the Commission provided they hold a certificate for the specific field issued by the state in which they are teaching. In the absence of such state certification, approval shall be determined by the judgment of the State Committee.

4.60 **Qualification of teachers in grades 7, 8, and 9 of a secondary school:** Teachers may be qualified by meeting certification and subject hour standards specified in the *Policies and Standards for the Accreditation of Junior High/Middle Schools*.

Staffing and Inservice

4.70 **Student/Professional Staff Ratio:** The ratio of students to teachers and other professional staff members shall not exceed 25 to 1. Only that portion of a staff member's time devoted to duties in the high school shall be counted in determining the student/professional staff ratio. The number of teachers employed in the high school shall be adequate to provide effective instruction, direction of extra-classroom activities, counseling, and other educational services.

4.71 **Teaching Load:** The teaching load shall permit teachers to have time to perform their duties. Except in certain activity-type classes such as typewriting, physical education, and music, the daily student load for each teacher shall not exceed 170 students.

When several staff members participate in a cooperative teaching project, the length of time of each person's participation shall be included when computing the individual teacher's load.

Exceptions to this standard shall be approved by State Committees when evidence is submitted that teachers are regularly provided with clerical and/or paraprofessional help for non-teaching duties.

4.72 **Preparation Period:** Within a six-hour instructional day, each teacher's schedule shall include one period daily or not less than 200 minutes per week for conferences and instructional planning.

The standard does not apply to administrators, counselors, librarians, and to people in certain vocational areas, when approved by the State Committee.

4.73 **Transcripts:** Transcripts of all professional staff members shall be on file in the school or district office.

4.74 **Inservice Education:** A program of inservice education shall be maintained to stimulate continued improvement of teaching and curriculum.

4.75E The professional staff improvement program shall include documented diagnosis of teacher performance and specific processes and resources for improvement.

4.76E Inservice programs shall be developed through needs assessments, faculty involvement, and faculty evaluations of each inservice program.

Special Professional Service Personnel

4.80 **Counselor:** Professional staff members employed as guidance counselors shall have at least 18 semester hours of graduate preparation in guidance and counseling in addition to teaching experience.

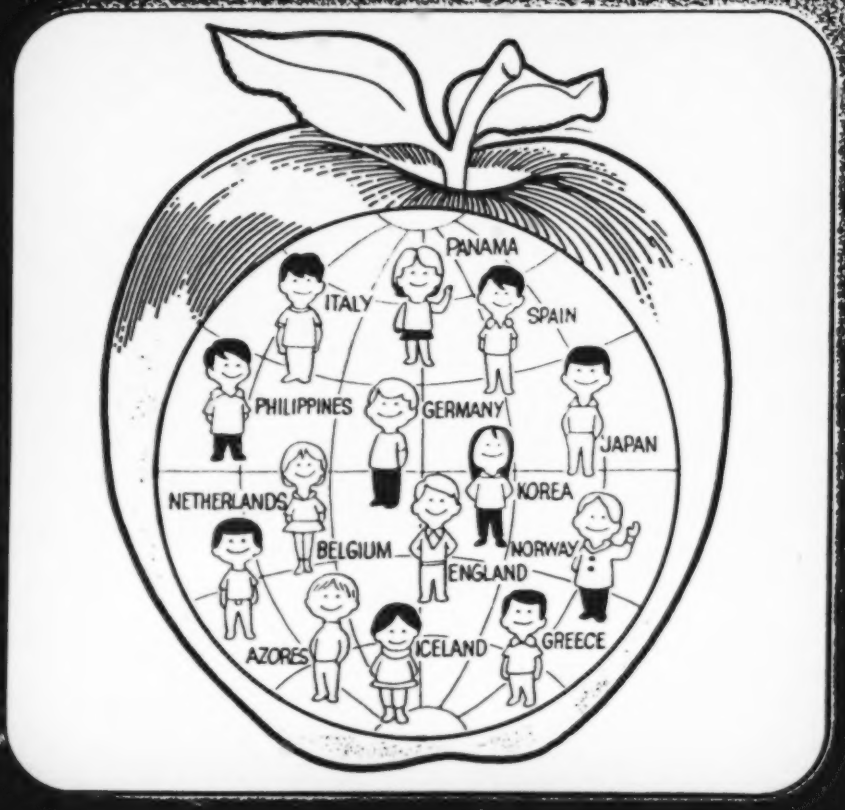
4.81 **Professional Media Personnel:** Librarians shall meet the classroom teacher requirements with reference to degree and professional preparation and also shall have a minimum of 18 semester hours of library science.

Persons employed as audio-visual specialists shall meet the classroom teacher requirements with reference to degree and professional preparation and also shall have at least 12 semester hours of credit in this field.

4.82 **Health Personnel:** Members of the non-instructional professional staff providing health services shall meet the health certification requirements of the state in which the school is located.

Administrative and Supervisory Personnel

The following requirements for specific administrative positions shall not apply to any qualified administrator who held the corresponding position in either an NCA or a non-NCA school prior to September 1, 1969, provided such person met the NCA standards for that position which were



The DoDDS Educator Applicant Evaluation Guide
School Year 1988 - 1989

DEPARTMENT OF DEFENSE DEPENDENTS SCHOOLS

APPENDIX D
INDEX

ELEMENTARY SCHOOL POSITIONS (Pre-Kindergarten - 8th Grade)	PAGE NUMBER
0090 PreKindergarten	D-2
0095 Kindergarten	D-2
0101-0103 Elementary Teacher,Grades 1,2,3	D-2
0104-0106 Elementary Teacher, Grades 4,5,6	D-2
0107-0108 Elementary Teacher, Grades 7 & 8	D-2
0150 Elementary Teacher, Art	D-2
0151 Elementary Teacher, Music	D-3
0155 Elementary Teacher, Physical Education	D-3
MIDDLE SCHOOL POSITIONS (Usually Grades 5-8)	
0210 Teacher, English	D-3
0211 Teacher, Speech	D-3
0212 Teacher, Journalism	D-4
0220 Teacher, Social Studies	D-4
0230 Teacher, Science	D-4
0234 Teacher, Health	D-5
0240 Teacher, Mathematics	D-5
SECONDARY SCHOOL POSITIONS (Usually Grades 7-12)	
0310 Teacher, English	D-3
0311 Teacher, Speech	D-3
0312 Teacher, Journalism	D-4
0320 Teacher, Social Studies	D-4
0330 Teacher, Science	D-4
0334 Teacher, Health	D-5
0340 Teacher, Mathematics	D-5
0350 Teacher, Art	D-2
0351 Teacher, Music	D-3
0355 Teacher, Physical Education	D-3
0360 Teacher, Business	D-5
0361 Teacher, Computer Science	D-6
0362 Teacher, Industrial Arts	D-6
0363 Work Experience Coordinator	D-6
0364 Teacher, Driver Education	D-6
0365 Teacher, Home Economics	D-6
0371 Teacher, French	D-7
0372 Teacher, German	D-7
0373 Teacher, Latin	D-7
0374 Teacher, Spanish	D-7
Training Instructor (Vocational) 0380-0393	
0380 Automotive Technology	D-8
0381 Electronics	D-8
0382 Cosmetology	D-8
0383 Graphic Arts	D-8
0384 Welding	D-8
0385 Dental Assistant	D-8
0386 Medical Assistant	D-8
0387 Small Engines	D-8
0388 Instrument Repair-Musical	D-8
0389 Computer Technology	D-8
0390 Fashion Design	D-8
0391 Power Technology (solar, thermal, hydro or nuclear)	D-8
0392 Agriculture	D-8
0393 Industrial Repair	D-8

Subject/ Category	Qualifications	Creditable Departments	Creditable Courses	Area of Certification	Selection Factor	Second Category
0212 Journalism 0312 Journalism	18 semester hours in journalism, or a minimum of 5 semester hours in journalism plus sufficient additional work in related fields such as communications, speech or English to total at least 18 semesters hours. 24 semester hours in journalism, or a minimum of 5 semester hours in journalism plus sufficient additional work in related fields such as communications, speech or English to total at least 24 semester hours.	Journalism, Speech, English, Communications.	Introduction to Journalism; Exposition; Creative Writing; Creative and Editorial Writing; Newspaper Editing.	Grades: 6-12 Title: Journalism	1 year teaching journalism at the middle or secondary level.	Must qualify in one other category.
0220 Social Studies 0320 Social Studies	18 semester hours in the field of social studies, appropriately distributed in the subjects to which assigned. Coursework should include U.S. history, world history, political science, and geography. 24 semester hours in the field of social studies, appropriately distributed in the subjects to which assigned. Coursework should include U.S. history, world history, political science, and geography.	Social Science, History, Social Studies, Economics, Government, Geography, Psychology, Sociology, Anthropology, Ethnic Studies.	Age of Renaissance; European History; Political Science; Constitutional Law; American Government; Introduction to Psychology; Cultural Studies; Introduction to Sociology	Grades: 6-12 Title: Social Studies	1 year teaching social studies at the middle or secondary level.	Must qualify in one other category.
0230 Science 0330 Science	18 semester hours in the field of science appropriately distributed in the subjects to which assigned. For biology, chemistry, and physics, a minimum of 9 semester hours is required in the subject area. 24 semester hours in the field of science appropriately distributed in the subjects to which assigned. For biology, chemistry, and physics, a minimum of 9 semester hours is required in the subject area.	Chemistry, Biology, Zoology, Botany, Physics, Earth Science, Science, Biological Science, Physical Science, Space Science, Environmental Studies.	Chemistry; Ecology; Embryology; Morphology; Qualitative Analysis; Lab Prep; Genetics; Anatomy; Experimental and Research Techniques; Ecology; Embryology; Entomology; Genetics; Histology; Life Science; Microscopy; Morphology; Ornithology; Parasitology; Physiology; Bacteriology; Anatomy; Geology; Intro. to Chemistry; Quantitative Analysis; Physics; Physical Science; Environmental Science; Earth Science; Space Science.	Grades: 6-12 Title: Science	1 year teaching science at the middle or secondary level.	Cat. 0230. Must qualify in one other category. Cat. 0330. Second category not required.

DEPARTMENT OF DEFENSE
OFFICE OF DEPENDENTS SCHOOLS
2461 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22331

EDUCATION

DS REGULATION 2000.1
September 7, 1984

DEPARTMENT OF DEFENSE DEPENDENTS SCHOOLS HIGH SCHOOL GRADUATION REQUIREMENTS

Reference: DoD Directive 1342.6, October 1, 1978, Department of Defense Dependents Schools (DoDDS), with change 1

A. PURPOSE

This Regulation establishes uniform high school graduation requirements for the Department of Defense Dependents Schools (DoDDS).

B. CANCELLATION

This Regulation cancels DS Regulation 2000.1, March 21, 1977, same subject.

C. APPLICABILITY

This Regulation applies to all high schools and other schools with high school grades.

D. DEFINITIONS

1. High School Student. A high school student is a student who is enrolled in grades 9, 10, 11, or 12.

2. High School Grades. High school grades are grades 9 through 12.

3. High School Course. A high school course is a course offered in high school grades taken by an enrolled student.

4. Units of Credit. Units of credit are to be computed and awarded to each Grade 9-12 student on a semester basis. One unit of credit signifies the successful completion of the study of any subject meeting five periods, or its equivalent, per week for two semesters, 18 weeks each (a minimum of 120 clock hours of instruction); one-half unit of credit signifies the successful completion of the study of any subject meeting five periods, or its equivalent, per week for one semester, 18 weeks; one-quarter unit of credit signifies the successful completion of the study of any subject meeting an average of 2½ times, or its equivalent, per week for one semester (18 weeks). Grade 7 and 8 students authorized enrollment in 9-12 classes (i.e., Spanish I) will be awarded the appropriate units of credit for successful course completion. However, credits so earned by 7th or 8th grade students will not be considered as fulfilling any portion of graduation requirements.

DISTRIBUTION: X

5. Required and Elective Courses. A required course is a course that every high school student must complete for graduation as required by this regulation. (See section E.1.) An elective course is one that is not required for graduation but is chosen to meet academic and vocational needs.

6. Laboratory Course. A course that will include a minimum of 30 experiential (non-lecture) periods per year.

E. POLICY

1. A minimum of 20 units of credit is required for high school students to graduate from a DoDDS high school, starting with school year 1987-88. Fifteen of the 20 units will be in required areas and can only be earned in stipulated courses. It should be emphasized that these are minimum requirements.

Requirements:

	UNITS
Language Arts (English, reading, speech, and journalism)	4
Social Studies (1 unit of U.S. History and ½ unit of U.S. Government required)	3
Mathematics	2
Science (Two laboratory sciences are required)	2
Career Education (home economics, industrial arts, business education, cooperative work experience, automotive technology, graphic communications, cosmetology, medical/dental technology, electricity/electronics)	1
Aesthetics (art, music, humanities, drama, dance)	1
Physical Education	1
Health	½
Computer Science	½
	15

Electives:

Foreign Language	2
(For the college bound student, two years of foreign language are strongly recommended.)	5
TOTAL	20

Requirements: (Con't)

2. For school year 1984-85 through school year 1986-87, 18 units of credit will be required for high school students to graduate from a DoDDS high school. One unit of mathematics and one unit of science will be required during this period of time.

3. Students may graduate when they have met the graduation requirements usually scheduled over a 4-year period.

4. In individual cases, the principal may grant waivers for graduation requirements, if, in his or her opinion, such action is considered to be in the best interests of the student.

5. DoDDS will accept the official grades and courses of transfer students. Courses interrupted by transfer may be continued to completion, if, in the judgement of the principal, the time lost in transfer did not impact negatively on a student's chances for successful completion.

6. Students enrolling in a DoDDS school during their senior year may be graduated by meeting the requirements of their previous school if, through no fault of their own, they cannot meet DoDDS graduation requirements.

7. Generally, students are expected to complete an 8-semester high school program in preparing for graduation. Upon application, students may be graduated early after completing graduation requirements if they have clearly demonstrated scholastic aptitude or vocational readiness, if there is a financial need for early entry into the labor market, or if health and other mitigating circumstances would be served. An application, with parental approval, must be in writing. The application for early graduation must be submitted prior to course selection for grade 12 students desiring to graduate at the end of the first semester of their senior year. All students qualifying for high school graduation will receive the same diploma. Students who are handicapped as defined by DoD Instruction 1342.12, may qualify for graduation by either (1) satisfying the requirements of this Regulation; or (2) meeting the objectives for graduation in their Individualized Education Program; or (3) earning Carnegie Units.

8. With approval of the principal, a correspondence course may be substituted for a course which is not available. (A maximum of 4 units of such credit may be accepted; however, more may be accepted for physically handicapped students and for students residing in locations where an accredited high school is not available for resident study.)

F. RESPONSIBILITIES

1. Principals will:

a. Comply with policies outlined in this Regulation.

b. Ensure that students recognize that the 20 units required for graduation are a minimum requirement. Ensure that students recognize that accrual of additional units of credit e.g., 2 years of foreign language, during their 4-year high school career will provide them with a distinct advantage in pursuing post-high school education.

F. RESPONSIBILITIES (Con't)

c. Grant course credit in accordance with standards of DoDDS accreditation agency, the North Central Association of Colleges and Schools.

d. Maintain permanent records of courses, grades, credits earned, and all documentation for approval of waivers.

2. Students are responsible to become informed of other requirements for their post-high school plans.

G. EFFECTIVE DATE AND IMPLEMENTATION

This Regulation is effective with school year 1984-85. The requirements of this Regulation will not be supplemented. Two copies of implementing instructions shall be forwarded to Director, DoDDS, within 90 days of the effective date.

Beth Stephens

Beth Stephens, Ph.D.
Director